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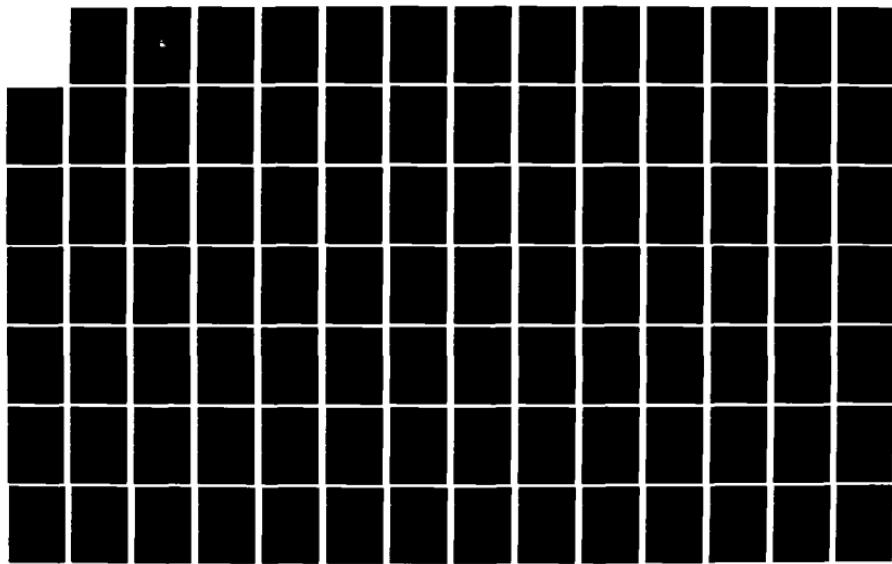
PRODUCTIVITY REVIEW AND ANALYSIS OF DIRECTORATE OF
ENGINEERING AND HOUSING AT SCHWEINFURT MILITARY
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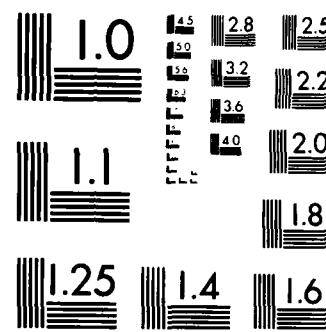
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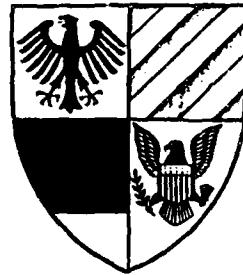
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PRODUCTIVITY REVIEW AND ANALYSIS
DIRECTORATE OF ENGINEERING AND HOUSING

AD-A149 392

SCHWEINFURT MILITARY COMMUNITY



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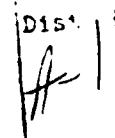
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PRODUCTIVITY REVIEW
OF
DIRECTORATE OF ENGINEERING AND HOUSING
AT
SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * EXECUTIVE SUMMARY * * *

PRODUCTIVITY REVIEW
OF
DIRECTORATE OF ENGINEERING AND HOUSING
AT
SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * EXECUTIVE SUMMARY * * *

1.0 BACKGROUND

At the direction of the U.S. Army Installation Support Activity, Europe (USAISAE) a productivity review and management enhancement study of the Directorate of Engineering and Housing at Schweinfurt Military Community was performed by E. L. HAMM & ASSOCIATES, INC., Virginia Beach, Virginia, during the months of July through September 1984.

2.0 OBJECTIVE

The objective of this study is to provide a comprehensive review of the Directorate of Engineering and Housing at the Schweinfurt Military Community and to make recommendations, both tangible and intangible, that will increase productivity and insure the maximum effectiveness of the Real Property Maintenance Activity (RPMA) expenditures at Schweinfurt. Accomplishment of the foregoing objective will assist the Directorate of Engineering and Housing in providing the necessary support to the community and specifically the units attached to Schweinfurt and Daley Barracks. This support will enhance the mission of the community through a state of readiness and by keeping the morale of the soldier and his family high.

A secondary purpose of the study is to identify and adjust ineffective and inefficient government in-house operations to insure their capability of competing with outside contractors.

3.0 APPROACH

The approach used in carrying out this productivity review was:

- Conduct inbrief with USAISAE and representatives from the Schweinfurt, Baumholder and Karlsruhe communities.
- Conduct a three week on-site visit at Schweinfurt and Bad Kissingen to gather data.
- Conduct preliminary analysis of collected data and identify potential adjustments and savings.
- Revisit the Schweinfurt Military Community for one week to gather additional data.
- Analyze data from other RPMAs to determine relative standing in control of work requirements and find areas of potential increased productivity.
- Compare data gathered and analyzed with data gathered and analyzed from other RPMAs.
- Complete analysis of data and develop a draft report.
- Upon receipt of comments from USAISAE, develop a final comprehensive report.

Prior to commencing the on-site data collection, E. L. HAMM & ASSOCIATES conducted a briefing with the Deputy Commander of the Schweinfurt Community and the Division Chiefs of the Directorate of Engineering and Housing. In addition, with the approval of the Deputy DEH and the Chairman of the Works Council a separate briefing was held for the workforce, one brief at Schweinfurt and a separate one at Bad Kissingen. After the briefings, E. L. HAMM & ASSOCIATES project personnel proceeded to inspect the in-house procedures and DEH management systems as well as beginning the work sampling phase of the study. Information gathered during other productivity studies was used as a base for comparison when appropriate. Workload and job/task assignment data was collected and analyzed with the goal of identifying areas of

potential increased productivity. Extensive interviews with management and some shop personnel was conducted to insure E. L. HAMM & ASSOCIATES not only understood the workload requirements, but also comprehended any constraints imposed due to regulations on local custom that could effect productivity.

4.0 SUMMARY OF MAJOR FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

A detailed review of current operations and available data from Fiscal Year (FY) 1984 resulted in numerous findings, inclusions and recommendations, the major points of which are summarized on the following pages.

- The calculated productive, indirect productive, and nonproductive percentages for the Directorate of Engineering and Housing during the period observed were:

	<u>Productive</u>	<u>Indirect Productive</u>	<u>Non-Productive</u>	<u>Total</u>
Percentage	62.0	28.0	10.0	100.0
Time per Day	4 h 58 m	2 h 14 m	0 h 48 m	8 h 0 m

Confidence in these figures is high; the methodology employed has a maximum sampling error of +1.3%. Stated in lay terms, the chances are approximately 9,973 out of 10,000 that the productive, indirect productive and nonproductive times are within the following ranges:

<u>Productive</u>	<u>Indirect Productive</u>	<u>Non-Productive</u>
60.7-63.3%	26.3-29.2%	9.2-10.3%

Exhibits E-1 through E-3, pages E-7 through E-8, present a comparison of the work efforts of the Schweinfurt Military Community to several Real Property Maintenance Activities including Baumholder and Karlsruhe.

- E. L. HAMM & ASSOCIATES recommends the DEH at Schweinfurt make several changes (contained in Sections II and V of this report). Some of the recommendations are tangible and some intangible. Those that can be quantified create the following recommended percentage as goals.

	<u>Productive</u>	<u>Indirect Productive</u>	<u>Non-Productive</u>
Percentage	65.1	24.0	10.9
Time per Day	5 h 13 m	1 h 59 m	1 h 13 m

It should be noted, there is no projected change in the nonproductive category. Ten percent is the lowest observed by HAMM ASSOCIATES at any activity which can be seen graphically in Exhibit E-3. The increase in productivity represents an increase of 3.1% or 15 minutes per day per craftsman, a total savings of \$45,511 or 8,994 person hours per year.

- The practice of returning to the shop for lunch is costing the DEH 7 minutes per day per craftsman or \$19,935 each year.
- There is an acute shortage of transportation for craftspeople at Schweinfurt and Bad Kissingen. It is recommended that small motorized vehicles (golf cart type) be used for response to Service Orders. These vehicles can be outfitted with locked cabinets that will permit a craftsman to carry adequate truck stock for routine Service Order calls. While there is some concern about inclement weather, this mode of transportation is far superior to walking or riding a bike which is the present procedure.
- An administrative DEH Motor Pool is recommended to make better use of the vehicles available. It was commonplace to find 3 to 5 administrative vehicles setting in the DEH compound during our on-site visit while division personnel complained of no vehicles available and used their private vehicles to conduct their work.
- Over 50% of the Service Orders and Preventive Maintenance work observed during the on-site visit were of a Self-Help nature (change light bulbs, unclogging drains, etc.). The Carpentry/Masons, PM, Refrigeration/AC, Plumbing, Electrical, and Paint shops are the primary shops involved in this type of work. These five shops have a total of 34 craftspeople at Schweinfurt and Bad Kissingen. If 50% of their time was applied to more meaningful work and not Self-Help a cost avoidance of \$176,664 is possible, (32,735 (project 30 hours one year) x .5 (percent Self Help) = 16,365 hours) plus 22 (craftsman in PM shops) x 1635 (available hours) x .5 (percent Self Help) = 13,545 hours) = 34,911 (total annual Self Help hours.) x \$5.06 = \$176,664.34.

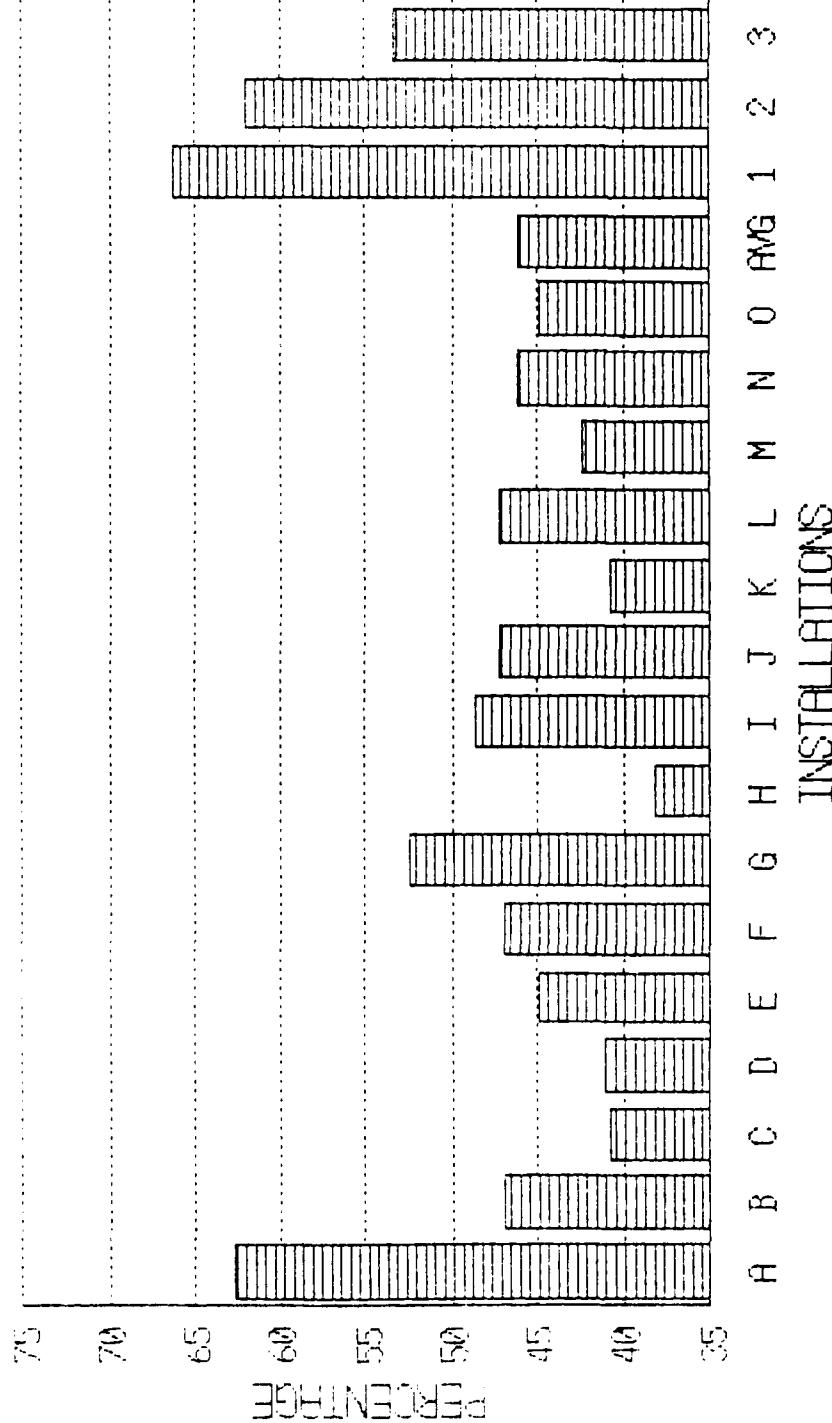
- Service Order completion time is not being reported accurately to ERMD. The average time reported for all SOs according to ERMD records is 135 minutes. During work sampling phase of this study where 100 SOs were observed being completed, it required 58 minutes on the average or 77 less minutes than was actually charged to jobs. With an estimated 18,500 SOs that will be completed in FY84 a cost avoidance of \$120,133 [(18,500 SOs x 77 minutes)/(60 minutes x \$5.06 hourly rate unburdened) = \$120,132.83 cost avoidance].
- A Do It Now (DIN) Team is recommended for the Schweinfurt Military Community. The purpose of such a team is to make better use of craft skills outside of primary skills of each craftsman. Identification of craftspeople as a General Mechanic much like the PM teams, will permit one person to respond to several SOs in a building instead of several craftspeople for one SO each. The travel time to and from jobs as well as control of the work to be done can be greatly improved. It is recommended in the main text of this report that small vehicles (golf cart type) and radio dispatching directed from ERMD be utilized to control the DIN teams.
- It is recommended the Work Reception Space currently in the Housing Division be moved to ERMD work reception for better continuity of work effort and better use of time available from this space.
- A Self-Help training program should be instituted and made mandatory for Family Housing occupants and assigned personnel for each unit within the community. Department of the Army Pamphlet 210-2, Handbook for Family Housing Occupants, should be used as a guide for the program.
- There is no "Demand System" in effect at Schweinfurt for purpose of adding new line items to the RPMA warehouse. In order to give maximum support to the DEH craftspeople the required materials to do the jobs must be available. There is a constant upgrading of facilities at Schweinfurt Military Community as well as new construction ongoing. Without a Demand System, new equipment will go unsupported in the supply warehouse.
- Shop Stock by definition from AR 420-17 is common/high frequency used items. These items should be directly supported by the RPMA warehouse. As a point of fact the Refrigeration and Organizational Maintenance Shops receive very limited support for their Shop Stock and the Electrical Shop carries 50 items of high use that are not in the RPMA warehouse. It is recommended each shop prepare a shop stock list for approval by the Division Chiefs and the RPMA Chief and as a minimum these approved items be stocked in the RPMA warehouse. This action coupled with the demand system will create a useable shop stock.

- A recap of potential cost avoidance is shown below:

- Increase Productivity to 65.1%	\$ 45,511
- Reduce Self Help Work	176,664
- Monitor Service Order Time more effectively	120,133
TOTAL PROJECTED COST AVOIDANCE	<u>\$342,222</u>

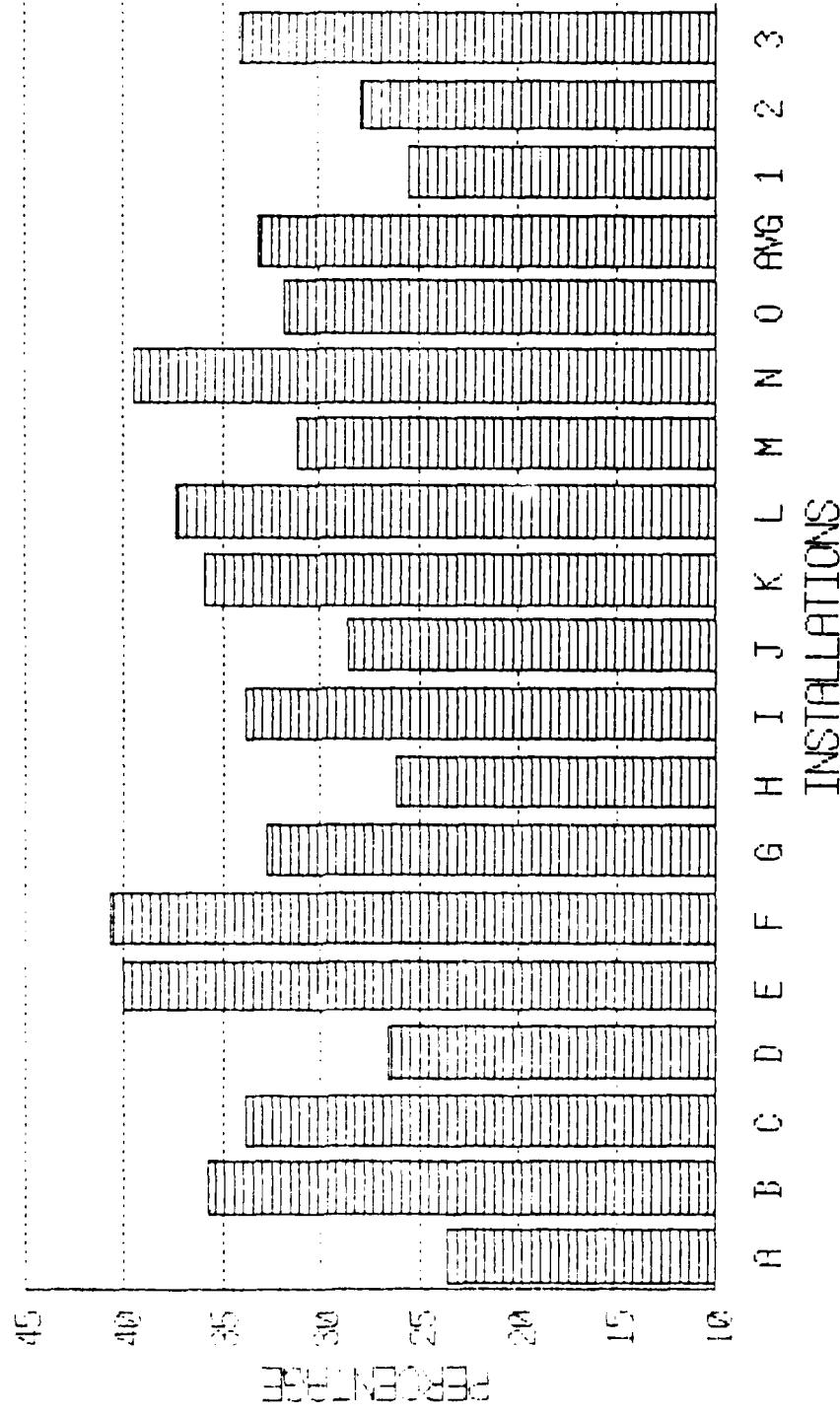
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DIRECT PRODUCTIVITY COMPARISON



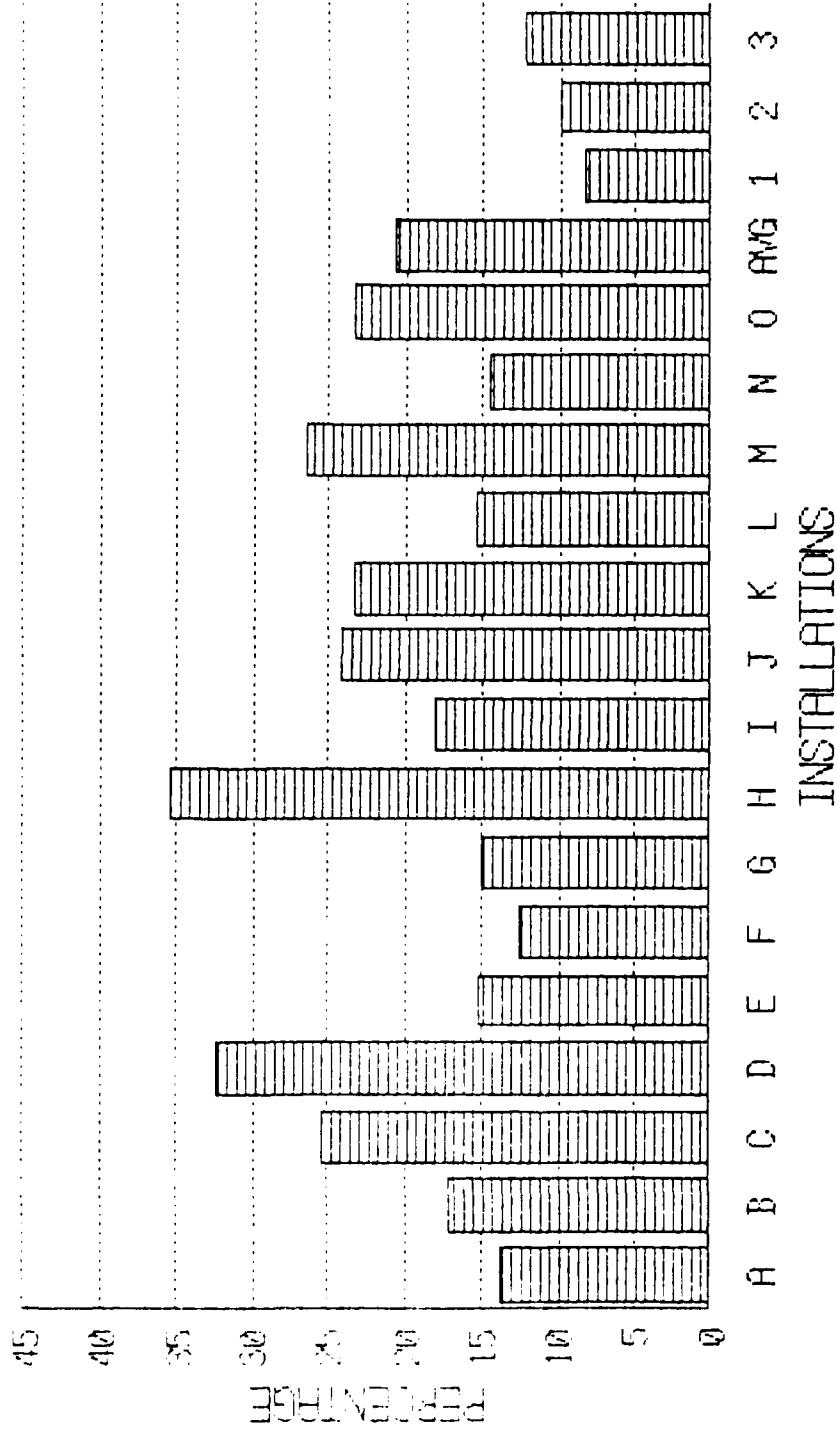
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INDIRECT PRODUCTIVITY COMPARISON



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NON-PRODUCTIVITY COMPARISON



A thru O are Continental U.S.
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SECTION I

PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * INTRODUCTION * * *

SECTION I
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * INTRODUCTION * * *

1.0 BACKGROUND

During July 1984, E. L. HAMM & ASSOCAITES, INC. (hereinafter referred to as HAMM ASSOCIATES) conducted the initial on-site visit in preparation to perform a Productivity Review and Analysis of the Directorate of Engineering and Housing (DEH), Schweinfurt Military Community. This study was conducted under contract number DACA65-84-C-0111. In August, 1984 a subsequent visit was made to verify the initial findings of fact and to collect additional data. The recommendations contained in this study are the result of HAMM ASSOCIATES findings of fact and opinions based on these facts. They do not necessarily reflect the Schweinfurt Military Community's policy.

2.0 PURPOSE

The purpose of this study is to determine the productivity of the maintenance shops including those at Daley Barracks, Bad Kissingen and to make recommendations designed to improve the efficiency and effectiveness of the organization. Additionally, the organization, staffing, workload and information flow of the DEH Divisions was reviewed with the purpose of making recommendations that will improve the overall support and management of the maintenance force. Both tangible and intangible improvements will be recommended that are cost effective and will ensure maximum efficiency and productivity thereby insuring the maximum return on the Real Property Maintenance Activity (RPMA) expenditures.

3.0 APPROACH

The following steps were used in the development of this study:

- Gather data on site through the use of work sampling and extensive interviews.
- Conduct preliminary analysis of data and identify those areas of potential increased productivity and dollar savings.
- Compare relative data gathered and, analyzed to other Army and Navy RPMAs.
- Revisit the Schweinfurt Military Community for verification and expansion of data originally collected.
- Complete analysis of data and develop a draft report.
- Upon receipt of comments from U.S. Army Installation Support Activity, Europe (USAISAE), develop a final comprehensive report to include Executive Summary.

The techniques and methods used for evaluation are listed below.

- Intensive Work Sampling
- Comparative Analysis
- Soliciting of Expert Opinion
- Review of Historical Data
- Informal Interviews
- General Observations

Prior to commencing the on-site data collection, two briefings were conducted. The first at USAISAE headquarters with cognizant personnel from USAISAE, Schweinfurt, Baumholder, Karlsruhe and the V Corps, VII Corps and 21st Support Command. The second brief was conducted at the Schweinfurt location with the Deputy Community Commander, Deputy, DEH and the Division/Branch Chiefs from DEH. In each of the briefings, the purpose of the data collection, the procedures to be used, and the areas which HAMI ASSOCIATES would investigate were discussed.

There are several methods of analysis that can be used in conducting the work sampling portion of the productivity study. HAMM ASSOCIATES has come to believe that the high intensity work sampling method as described in the Engineer Manual TB 420-1 is the most effective. Some of the advantages of high intensity work sampling are:

- Firsthand observation of what really goes on, avoids the pitfalls of making conclusions based on hearsay information arrived at during interviews.
- Avoids the pitfalls of basing future staffing recommendations on past recorded data. Historically it has been found that past records reflect not what was done or should have been done, but rather a workload ratio similar to the skills that existed during the period reviewed.
- While work sampling over an extended period of time, individual craftspersons freely reveal valuable information they do not reveal during shorter formal or informal interviews.
- While work sampling the analyst observes vast areas of the activity.

4.0 REPORT ORGANIZATION

This report is organized in sections relating to each division that was reviewed. Specific paragraphs in one section that may be applicable to another division are cross referenced for ease of reading.

4.1 Section II Work Sampling Analysis.

This section presents the results of all work sampling and is presented as overall total results, results by shop at Schweinfurt and total results at Bad Kissingen. This section will be referred to throughout the remaining sections and in particular the Maintenance Division section.

4.2 Sections III through VIII are as follows:

- Section III - Engineering Resources Management Division
- Section IV - Engineering Plans and Services Division
- Section V - Maintenance Divisions
- Section VI - Housing Division
- Section VII - Supply (RPMA)
- Section VIII - Employee Survey

SECTION II

PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

WORK SAMPLING
* * * STATISTICAL ANALYSIS * * *

SECTION II
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

WORK SAMPLING
* * * STATISTICAL ANALYSIS * * *

2.1 INTRODUCTION

A work sampling study utilizing the "high frequency method" (instantaneous observations at two-minute intervals) was conducted at Schweinfurt Military Community, Federal Republic of Germany during the initial on-site visit in July, 1984. Personnel from E. L. HAMM & ASSOCIATES observed craftspersons in the following work centers:

- Carpentry
- Electric
- Entomology
- Kitchen Equipment/Air Conditioning and Refrigeration
- Masonry
- Organizational Maintenance
- Paint
- Plumbing
- Preventive Maintenance
- Roads and Railroads
- Sewage Control
- Sheet Metal
- Steam Fitters

A detailed statistical analysis of the work sampling results is presented in Appendix A to this section.

2.2 OBJECTIVE

This portion of the productivity study is designed to measure the total productive, indirect productive, and non-productive activities of the blue collar work force. The statistics gathered in work sampling analysis do not reflect the efficiency or skill level of observed craftspersons. Engineering performance standards coupled with stopwatch time studies or other methods of estimating work efficiency must be used to determine craftpersons' ability to perform assigned tasks. The percentage measurements presented in this report establish the observed proportion of craft time that is spent performing tasks which are classified as either Direct Productive, Indirect Productive, or Nonproductive. The intensive work sampling method and accompanying statistical analysis discussed in Technical Bulletin 420-1, Chapter III, Section 6, was employed to define productivity levels at the Schweinfurt Military Community.

2.3 Definitions

<u>Productive</u>	-	Any activity which contributes directly to altering the composition, condition, conformation, or construction of the item or area being repaired or altered.
<u>Indirect Productive</u>	-	Any activity performed that renders assistance or preparation for the productive portion of a task. It is necessary or required work that does not alter the composition, condition, conformation or construction of an item.
<u>Non-Productive</u>	-	Idle time due to circumstances either controllable or uncontrollable by the Directorate of Engineering that does not contribute directly or indirectly to the accomplishment of a craft task.

2.4 General Analysis

Work sampling data of the Schweinfurt and Bad Kissingen Military Community (inclusive of DEH activities) is presented at the 95 percent confidence level and a production rate factor of less than or equal to 1.03. Exhibit II-4, page II-1, illustrates a summary of the work sampling results. Exhibits II-2, 3 and 4, pages II-5 through II-8, are the calculations for the confidence ranges for the total DEH and the Schweinfurt and Bad Kissingen shops. Exhibits II-5, page II-9, and II-6, page II-10, present work sampling percentage findings by shop and a subsequent ranking by productivity category. Exhibits II-3 and II-4, pages II-11 and II-12, present a comparison of observations recorded at the Schweinfurt Military Community with relative findings at other Army and Navy Real property Maintenance Activities. Exhibits II-1 through II-N, pages II-13 through II-18, show graphic illustrations of productivity findings by shop and by comparison with other DEH activities. Exhibit II-0, page II-19, illustrates the productivity distribution for the total Schweinfurt DEH. The total percentage distribution of the observations is presented in Exhibit II-P, page II-20. The distribution for the Schweinfurt shops and Bad Kissingen shop is presented in Exhibits II-Q and II-R, pages II-21 and II-22, respectively.

2.5 Workforce Demographics

An analysis of the employee survey (discussed in detail in Section VIII) indicated a demographic difference between the workforces at Schweinfurt and Bad Kissingen. The averages of the two workforces are

shown in Exhibit II-S, page II-23. The distribution of the years of service are shown in Exhibit II-T, page II-24, and the age distribution in Exhibit II-U, page II-25.

2.6 Summary

Observations made during the work sampling at Bad Kissingen support work sampling findings from the Schweinfurt DEH. Due to the similarity of sample data trends from both facilities, the analyses and recommendations made the following Appendices are valid and applicable to both Schweinfurt and Bad Kissingen.

While demographics of the workforce are different, work sampling findings at both facilities indicate the same or similar problem areas. Therefore, these craft problem areas must reflect deficiencies in the overall Schweinfurt DEH managerial structure, rather than problems inherent to a workforce at a particular location.

EXHIBIT II-A
SUMMARY
SCHWEINFURT MILITARY COMMUNITY

	<u>Productive</u>	<u>Indirect Productive</u>	<u>Non-Productive</u>
Percent	62%	28%	10%
Time Per Day	4 h 58 m	2 h 14 m	0 h 48 m

The methodology employed has a maximum sampling error of ±1.3%. Stated mathematically, the chances are 9,973 out of 10,000 that the productive, indirect productive, and non-productive percentages fall within the following ranges:

<u>Productive</u>	<u>Indirect Productive</u>	<u>Non-Productive</u>
60.7-63.3%	26.8-29.2%	9.2-10.8%

SUMMARY
BAD KISSINGEN

	<u>Productive</u>	<u>Indirect Productive</u>	<u>Non-Productive</u>
Percent	63.4%	26.4%	10.2%
Time Per Day	5 h 4 m	2 h 7 m	0 h 49 m

<u>Productive</u>	<u>Indirect Productive</u>	<u>Non-Productive</u>
60.4-66.4%	23.6-26.4%	8.2-12.1%

The calculations for the confidence ranges are contained in the following Exhibits II-B, II-C and II-D.

EXHIBIT II-B

COMPUTATION OF MAJOR CATEGORIES
STATISTICAL SUMMARY OF OBSERVATIONS

SCHWEINFURT MILITARY COMMUNITY (INCLUDING BAD KISSINGEN)

<u>PRODUCTIVE</u>	<u>INDIRECT PRODUCTIVE</u>	<u>NON- PRODUCTIVE</u>	<u>TOTAL</u>
<u>Observations:</u>			
7,566	3,420	1,224	12,210
<u>Percentages:</u>			
$\frac{7,566}{12,210} = 62.0\%$	$\frac{3,420}{12,210} = 28.0\%$	$\frac{1,224}{12,210} = 10.0\%$	

Computation of Confidence Intervals:

Where:

P = Precision Level Factor
 C_1 = Confidence Level Factor - Standard Deviation (3 for a 99.73% Confidence)
 F = Percentage of Item in Category
 N = Total Observations

$$P_P = \left(\frac{C_1^2 (1 - F)}{N} \right)^{1/2} = \left(\frac{3^2 (1 - .6197)}{12,210 (.6197)} \right)^{1/2} = .0213$$

$$P_{IP} = \left(\frac{3^2 (1 - .2801)}{12,210 (.2801)} \right)^{1/2} = .0435$$

$$P_{NP} = \left(\frac{3^2 (1 - .1002)}{12,210 (.1002)} \right)^{1/2} = .0814$$

$$\begin{aligned}
 \text{Productive} &= .62 \times .0213 = +.013 \text{ or } 1.3\% \\
 \text{Indirect Productive} &= .28 \times .0435 = +.012 \text{ or } 1.2\% \\
 \text{Non-Productive} &= .10 \times .0814 = +.008 \text{ or } .8\%
 \end{aligned}$$

Confidence Intervals at 99.73%

$$\begin{aligned}
 \text{Productive} &= 62.0\% + 1.3\% = 60.7\% \text{ to } 63.3\% \\
 \text{Indirect Productive} &= 28.0\% + 1.2\% = 26.8\% \text{ to } 29.2\% \\
 \text{Non-Productive} &= 10.0\% + .8\% = 9.2\% \text{ to } 10.8\%
 \end{aligned}$$

¹ Stephen P. Shao - Statistics for Business and Economics

EXHIBIT II-C

COMPUTATION OF MAJOR CATEGORIES
STATISTICAL SUMMARY OF OBSERVATIONS

SCHWEINFURT MILITARY COMMUNITY (EXCLUDING BAD KISSINGEN)

<u>PRODUCTIVE</u>	<u>INDIRECT PRODUCTIVE</u>	<u>NON- PRODUCTIVE</u>	<u>TOTAL</u>
<u>Observations:</u>			
6,129	2,822	994	9,945
<u>Percentages:</u>			
$\frac{6,129}{9,945} = 61.6\%$	$\frac{2,822}{9,945} = 28.4\%$	$\frac{994}{9,945} = 10.0\%$	
<u>Computation of Confidence Intervals:</u>			
$P_p = \left(\frac{C^2 (1 - F)}{NF} \right)^{\frac{1}{2}} = \left(\frac{3^2 (1 - .6163)}{9,945 (.6163)} \right)^{\frac{1}{2}} = .0237$			
$P_{IP} = \left(\frac{3^2 (1 - .2837)}{9,945 (.2837)} \right)^{\frac{1}{2}} = .0478$			
$P_{NP} = \left(\frac{3^2 (1 - .10)}{9,945 (.10)} \right)^{\frac{1}{2}} = .0902$			

$$\begin{aligned} \text{Productive} &= .616 \times .0237 = +.015 \text{ or } 1.5\% \\ \text{Indirect Productive} &= .284 \times .0478 = +.014 \text{ or } 1.4\% \\ \text{Non-Productive} &= .10 \times .0902 = +.009 \text{ or } .9\% \end{aligned}$$

Confidence Intervals at 99.73%

$$\begin{aligned} \text{Productive} &= 61.6\% + 1.5\% = 60.1\% \text{ to } 63.1\% \\ \text{Indirect Productive} &= 28.4\% + 1.4\% = 27.0\% \text{ to } 29.8\% \\ \text{Non-Productive} &= 10\% + .9\% = 9.1\% \text{ to } 10.9\% \end{aligned}$$

COMPUTATION OF MAJOR CATEGORIES
STATISTICAL SUMMARY OF OBSERVATIONS

BAD KISSINGEN

<u>PRODUCTIVE</u>	<u>INDIRECT PRODUCTIVE</u>	<u>NON- PRODUCTIVE</u>	<u>TOTAL</u>
<u>Observations:</u>			
1,437	598	230	2,265
<u>Percentages:</u>			
$\frac{1,437}{2,265} = 63.4\%$	$\frac{598}{2,265} = 26.4\%$	$\frac{230}{2,265} = 10.2\%$	
<u>Computation of Confidence Intervals:</u>			
$P_p = \left(\frac{C^2 (1 - F)}{NF} \right)^{1/2} = \left(\frac{3^2 (1 - .6344)}{2,265 (.6344)} \right)^{1/2} = .0478$			
$P_{IP} = \left(\frac{3^2 (1 - .2640)}{2,265 (.2640)} \right)^{1/2} = .1053$			
$P_{NP} = \left(\frac{3^2 (1 - .1016)}{2,2655 (.1016)} \right)^{1/2} = .1875$			

$$\begin{aligned}
 \text{Productive} &= .6344 \times .0478 = +.030 \text{ or } 3\% \\
 \text{Indirect Productive} &= .2640 \times .1053 = +.028 \text{ or } 2.8\% \\
 \text{Non-Productive} &= .1016 \times .1875 = +.019 \text{ or } 1.9\%
 \end{aligned}$$

Confidence Intervals at 99.73%

$$\begin{aligned}
 \text{Productive} &= 63.4\% + 3\% = 60.4\% \text{ to } 66.4\% \\
 \text{Indirect Productive} &= 26.4\% + 2.8\% = 23.6\% \text{ to } 26.4\% \\
 \text{Non-Productive} &= 10.2\% + 1.9\% = 8.3\% \text{ to } 12.1\%
 \end{aligned}$$

EXHIBIT II-E

SUMMARY OF OBSERVATION BY SHOP

SHOP	PRODUCTIVE		INDIRECT PRODUCTIVE		NON- PRODUCTIVE		TOTAL OBS
	OBS	%	OBS	%	OBS	%	
Carpentry	448	48.2	378	40.6	104	11.2	930
Electric	746	54.1	479	34.7	155	11.2	1380
Entomology	125	52.1	80	33.3	35	14.6	240
Kitchen/ACR	187	38.9	245	51.1	48	10.4	480
Masonry	571	64.5	220	24.9	94	10.6	885
Org. Maintenance	802	66.8	231	19.3	167	13.9	1200
Paint	971	76.2	212	16.6	92	7.2	1275
Plumbing	946	70.9	334	25.0	55	4.1	1335
PM	899	61.2	396	26.9	175	11.9	1470
Roads	204	54.4	120	32.0	51	13.6	375
Roofers	370	77.1	64	13.3	46	9.6	480
Sewage	298	62.1	153	31.9	29	6.0	480
Sheet Metal	312	36.5	398	46.5	145	17.0	855
Pipefitter	687	83.3	110	13.3	28	3.4	<u>825</u>
							12,210

EXHIBIT II-F

SHOP RANKING BY CATEGORY

<u>PRODUCTIVE</u>		<u>INDIRECT PRODUCTIVE</u>		<u>NON-PRODUCTIVE</u>	
Pipefitter	83.3%	Pipefitter	13.3%	Pipefitter	3.4%
Roofers	77.1%	Roofer	13.3%	Plumbing	4.1%
Paint	76.2%	Paint	16.6%	Sewage	6.0%
Plumbing	70.9%	Org. Maint.	19.3%	Paint	7.2%
Org. Maint.	66.8%	Masonry	24.9%	Roofers	9.6%
Masonry	54.5%	Plumbing	25.0%	Kitchen/ACR	10.0%
Sewage	62.1%	PM	26.9%	Masonry	10.6%
PM	61.2%	Sewage	31.9%	Electric	11.2%
Roads	54.4%	Roads	32.0%	Carpentry	11.2%
Electric	54.1%	Entomology	33.3%	PM	11.9%
Entomology	52.1%	Electric	34.7%	Roads	13.6%
Carpentry	48.2%	Carpentry	40.8%	Org. Maint.	13.9%
Kitchen/ACR	38.9%	Sheet Metal	46.5%	Entomology	14.6%
Sheet Metal	36.5%	Kitchen/ACR	51.1%	Sheet Metal	17.0%

EXHIBIT II-G

WORK SAMPLING SUMMARY
CURRENT VERSUS RECOMMENDED PERCENTAGES

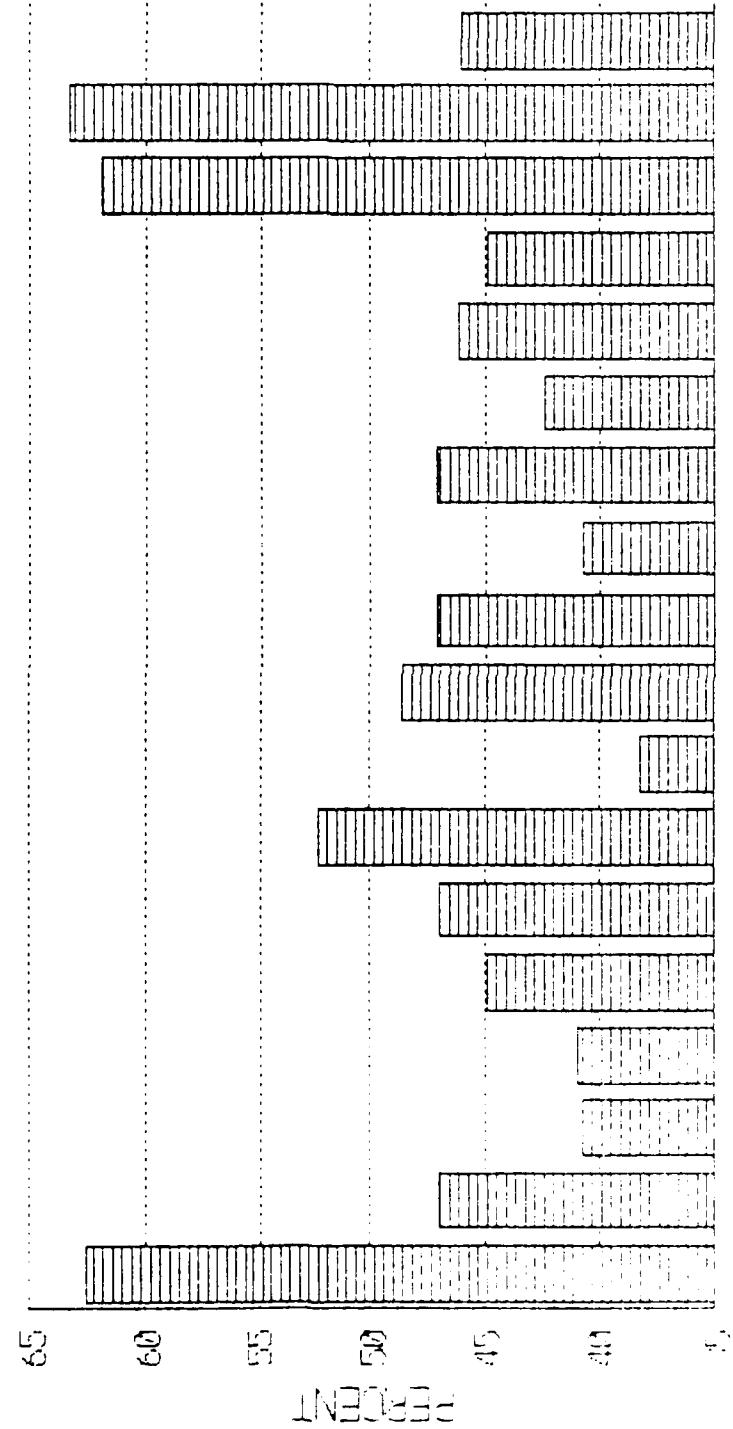
<u>FACILITY</u>	<u>PRODUCTIVE</u>		<u>INDIRECT PRODUCTIVE</u>		<u>NON PRODUCTIVE</u>	
	<u>CUR</u>	<u>REC</u>	<u>CUR</u>	<u>REC</u>	<u>CUR</u>	<u>REC</u>
A	62.6	65.0	23.6	21.2	13.8	13.8
B	47.0	61.9	35.8	27.8	17.2	10.3
C	40.7	59.8	33.8	24.8	25.5	15.4
D	41.0	60.0	26.6	26.6	32.4	13.4
E	44.8	60.0	40.0	27.0	15.2	13.0
F	46.9	60.0	40.7	27.6	12.4	12.4
G	52.4	66.9	32.8	20.6	14.8	12.5
H	38.3	60.0	26.2	25.4	35.5	14.6
I	48.6	62.8	33.9	24.2	18.0	13.0
J	47.2	60.0	28.7	27.6	24.1	12.4
K	40.7	59.0	35.9	24.8	23.4	16.2
L	47.2	62.8	37.4	23.7	15.4	13.5
M	42.4	60.0	31.2	27.6	26.5	12.4
N	46.1	61.1	39.4	26.2	14.5	12.7
O	44.8	59.6	31.8	21.6	23.4	18.8
Average ¹	46.0		33.2		20.8	
Schweinfurt (less B.K.)	61.6		28.4		10.0	
Bad Kissingen	63.4		26.4		10.2	

¹ Excluding Schweinfurt & Bad Kissingen

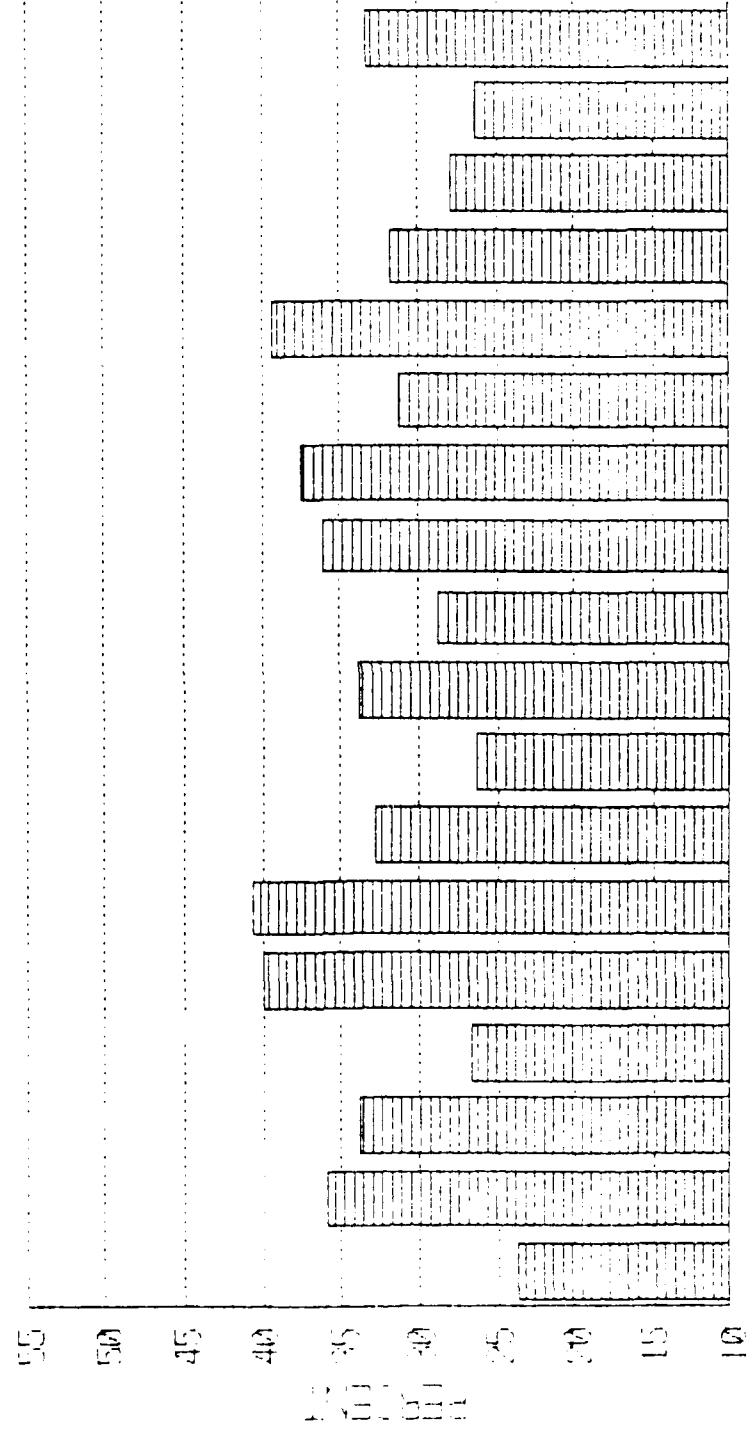
CATEGORY	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	S.M.C. • AVERAGE	
100	62.6	47.0	40.7	41.0	44.8	46.9	52.4	38.3	48.6	47.2	40.7	47.2	42.4	46.1	44.8	62.0	46.0
200	23.6	35.8	33.8	26.6	40.0	40.7	32.8	26.2	33.9	28.7	35.9	37.4	31.2	39.4	31.8	28.0	33.2
210	6.7	8.6	8.3	8.8	12.6	7.1	14.0	10.0	11.0	8.2	9.8	10.2	8.9	9.4	9.4	11.1	9.5
211	1.2	1.2	.9	1.9	1.3	2.3	.7	3.2	1.8	1.6	.4	1.1	1.4	2.1	.8	.7	1.4
212	1.2	1.3	1.2	2.7	5.3	2.3	1.0	3.4	4.0	3.1	1.7	1.6	1.4	2.0	2.3	2.1	2.2
213	2.0	3.4	3.6	3.4	2.9	.9	6.0	1.4	4.1	1.9	6.3	5.5	4.5	4.4	4.5	6.2	3.6
214	.6	2.0	1.8	1.3	.9	.4	1.9	1.4	1.0	1.1	1.0	1.0	.3	1.2	1.9	1.1	
215	.1	.1	.5	.1	.7	.1	.3	.3	.1	.1	.3	.1	.1	.3	.2	.2	
216	1.6	.6	.3	.2	1.5	1.1	4.1	.3	.5	.1	.7	.7	.5	.3	.0	.9	
220	.3	1.8	2.1	1.8	.5				1.3	4.1	2.4	4.4	4.3	2.5	1.2	.7	2.2
221														1.5	1.0	.4	1.3
222														1.0	.2	.3	.6
230	13.9	17.8	16.0	10.2	20.4	28.9	13.9	10.9	15.3	9.6	18.0	15.8	12.9	17.9	15.6	11.0	15.8
240	1.1	2.3	2.1	2.6	2.0	.5	1.4	1.1	2.1	1.1	1.8	1.8	1.7	4.0	2.2	1.5	1.9
250	.2	1.5	2.8	1.3	2.9	.5	1.8	.6	1.1	1.6	1.4	1.2	.8	2.1	.7	.2	1.4
260	.2	.3	.6	.3	.1	.4	.8	.2	.4	.4	1.0	.2	.4	.4	.8	.7	.4
270	.2	.1	.7	.1	.2	.3	.3	.1	.1	1.0	.4	.5	.1	1.3	1.0	.5	.4
280	.1	1.0	.5	.5	.3	.1	.4	1.6	.7	1.1	.9	.4					.6
290	1.0	2.5	1.2	1.5	1.4	2.7	1.1	3.1	1.3	2.1	.7	1.6	2.1	1.9	.9	2.2	1.7
300	13.8	17.2	25.5	32.4	15.2	12.4	14.9	35.5	18.0	24.1	23.4	15.4	26.5	14.5	23.4	10.0	20.8
310	9.6	7.3	11.1	14.4	9.5	4.2	9.4	6.8	10.6	16.6	13.9	10.2	13.8	8.8	11.4	8.2	10.5
311	.4	.2	.4	.2	.4	.7	.3	.5	.5	.5	.1	.7	.5	.5	.3	.5	.4
312	2.4	1.8	4.1	9.3	4.9	1.3	2.2	3.2	1.8	12.7	5.2	4.8	6.2	5.6	6.3	3.6	4.8
313	.4	1.8	4.1	.5	2.4	1.5	3.0	.5	1.8	.9	3.4	2.4	2.6	.7	1.8	.8	1.9
314	6.5	3.5	2.5	4.4	1.8	.7	3.9	2.6	6.5	2.5	5.2	2.3	4.5	1.8	3.0	3.3	3.4
320	.1	1.3	.1	.4	.1	1.4	.4	2.6	.6	.8	1.0	.9	.1	.7	.2	.6	
330	3.9	8.1	11.5	17.1	5.6	7.9	2.0	2.5	2.6	5.9	6.9	1.8	11.3	3.9	10.5	.7	6.8
331	3.0	5.7	10.6	13.9	2.4	.7			1.5	3.4	2.2	9.2	.1	.8	.06	.45	
332	.3	2.1	.1	2.7	2.9	5.8		10.0	.4	1.5	.7	2.0	.8	3.1	.2	2.5	
333	.6	.3	.8	.5	.3	1.5		.7	1.0	.5	.7	.1	.7	.2	.2	.6	
334								14.8	.5	3.3							
335	.2	1.9	1.6	.9	.3	2.0	4.0	2.2	1.0	2.0	1.3	.4	1.0	1.4	1.1	1.4	
340										1.8				1.0	1.1	1.1	1.3
341										.3				.3	.0	.3	
343																	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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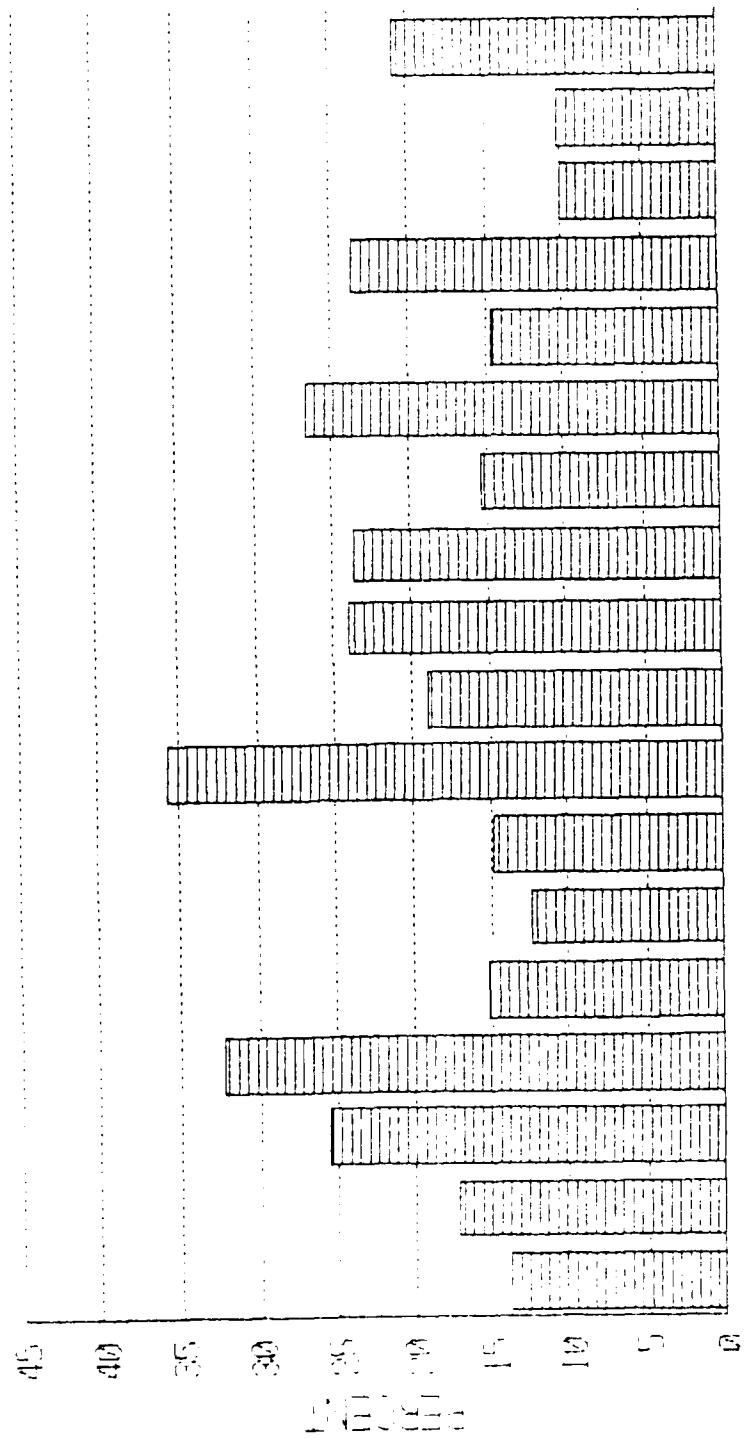
DIRECT PRODUCTIVITY COMPARISON



INDIRECT PRODUCTIVITY COMPARISON

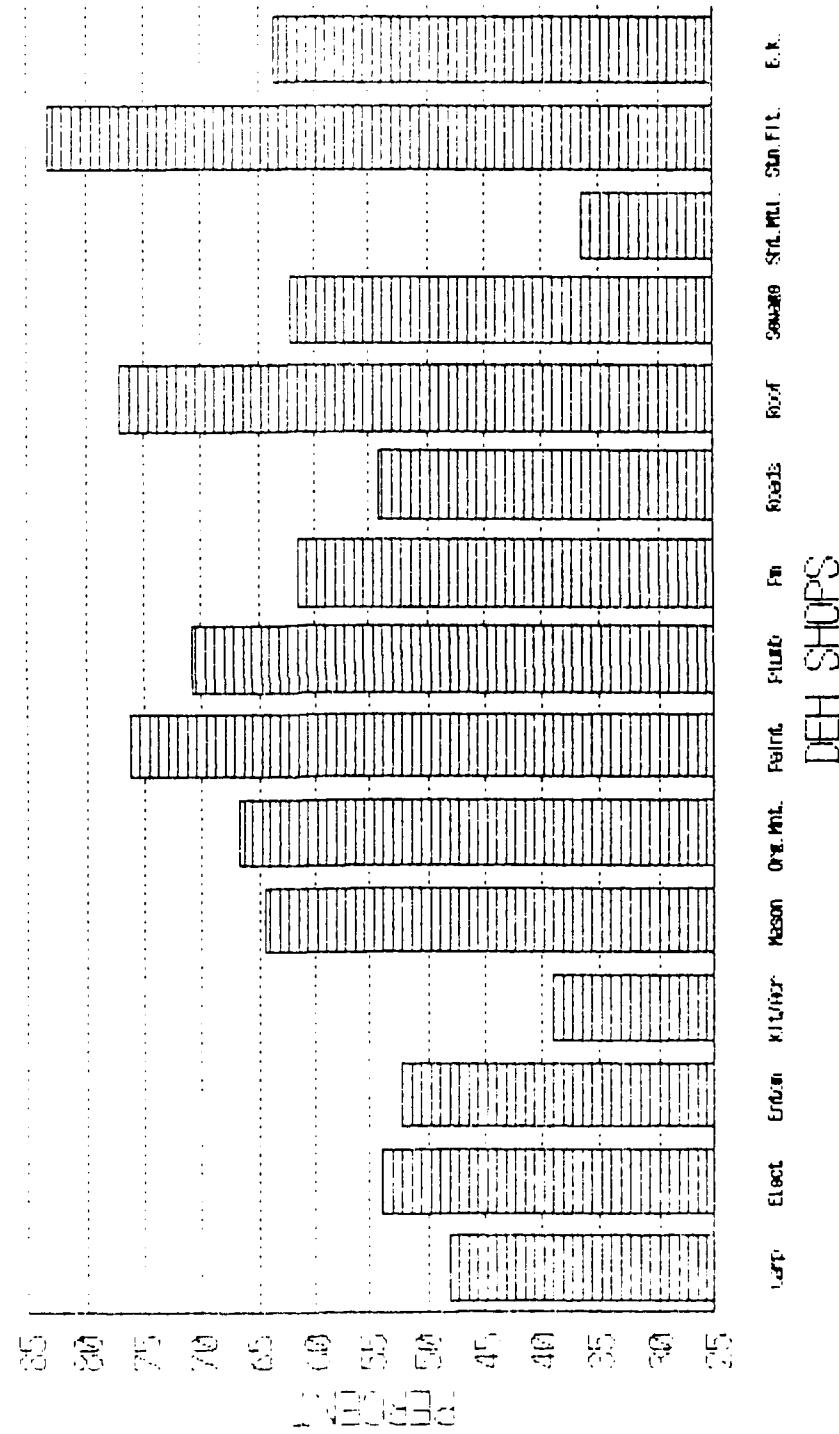
H B C D E F G H I J K L M N O S M C B E F S
INSTALLATIONS

NON-PRODUCTIVITY COMPARISON

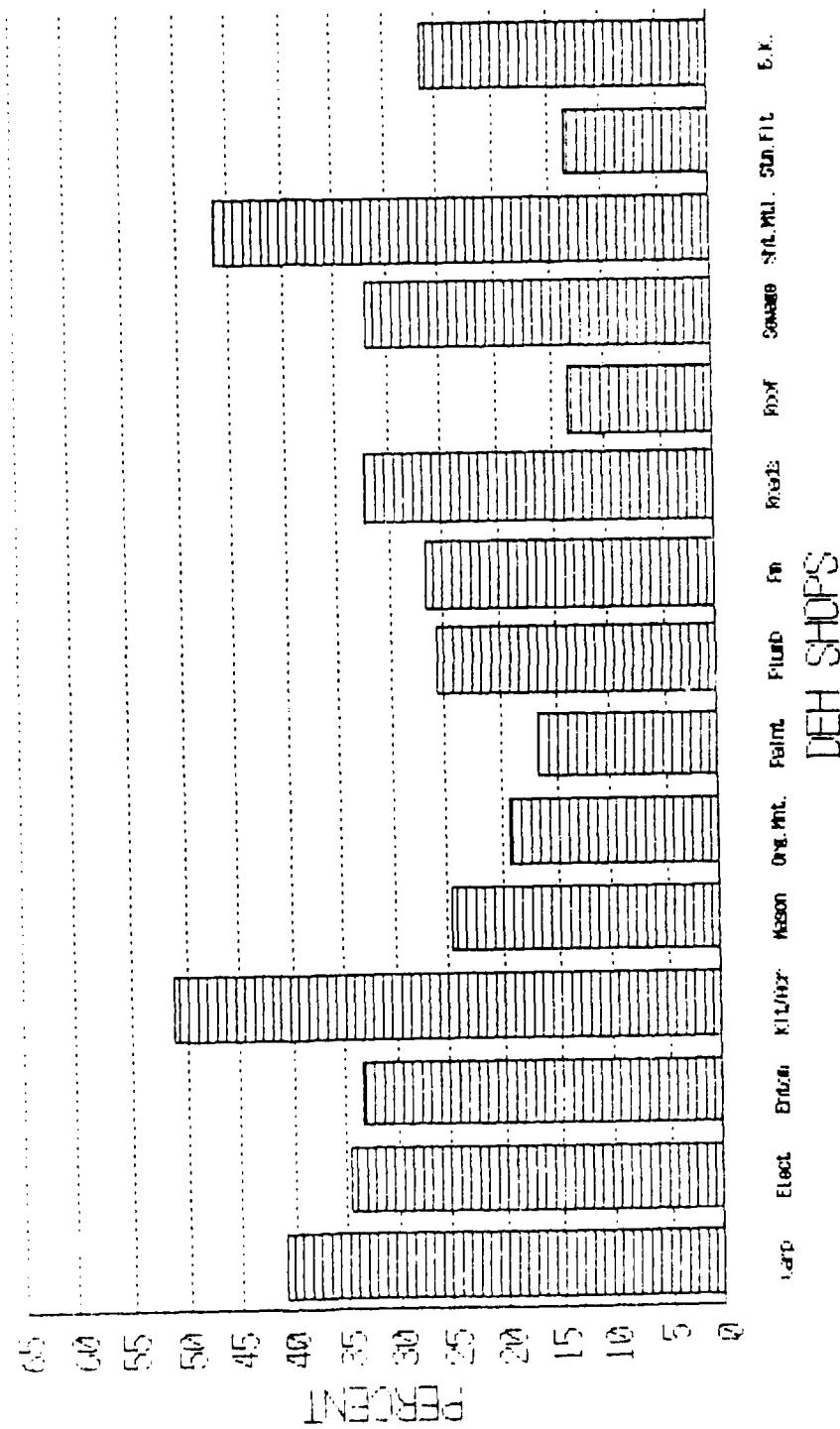


INSTALLATIONS

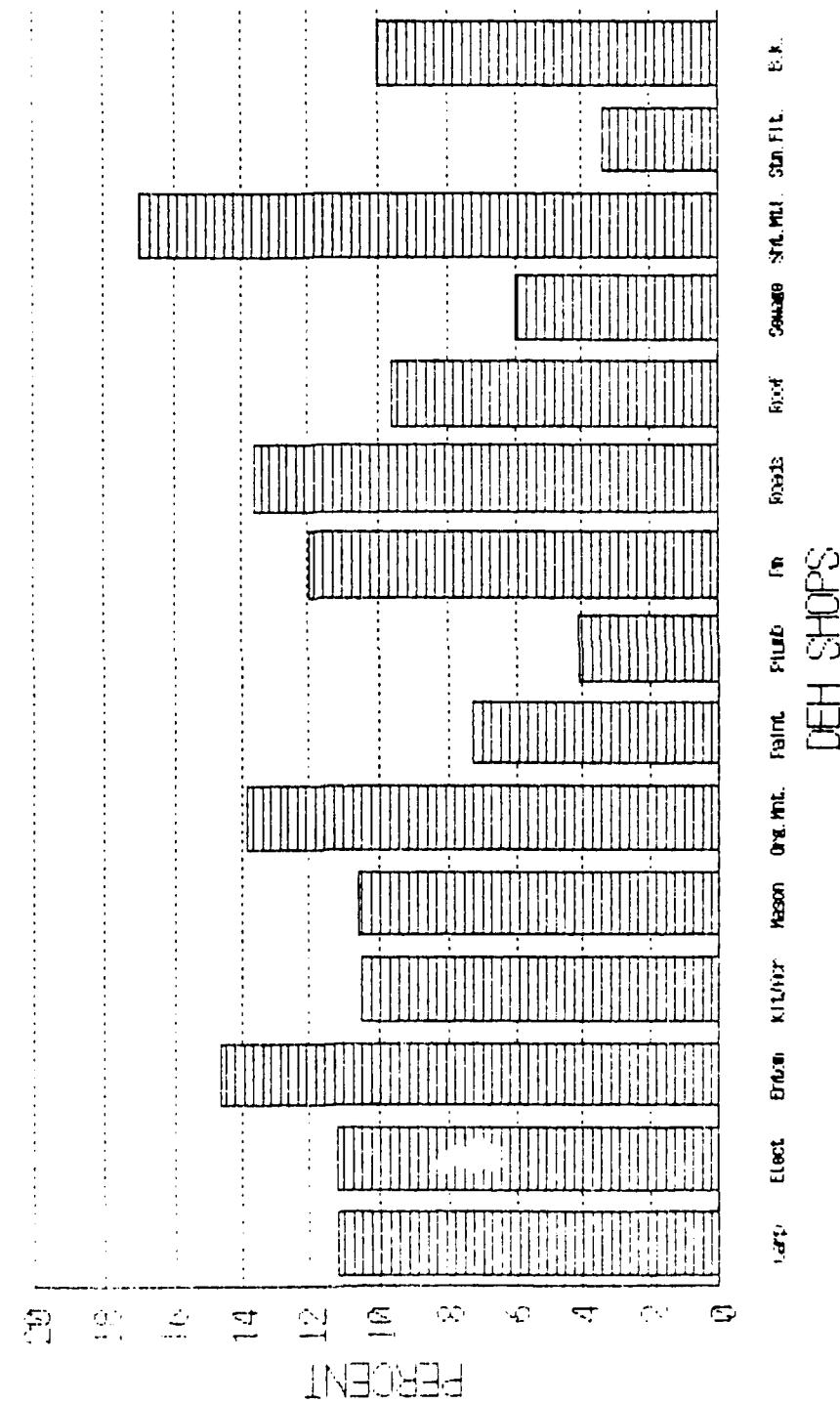
DIRECT PRODUCTIVITY COMPETITION



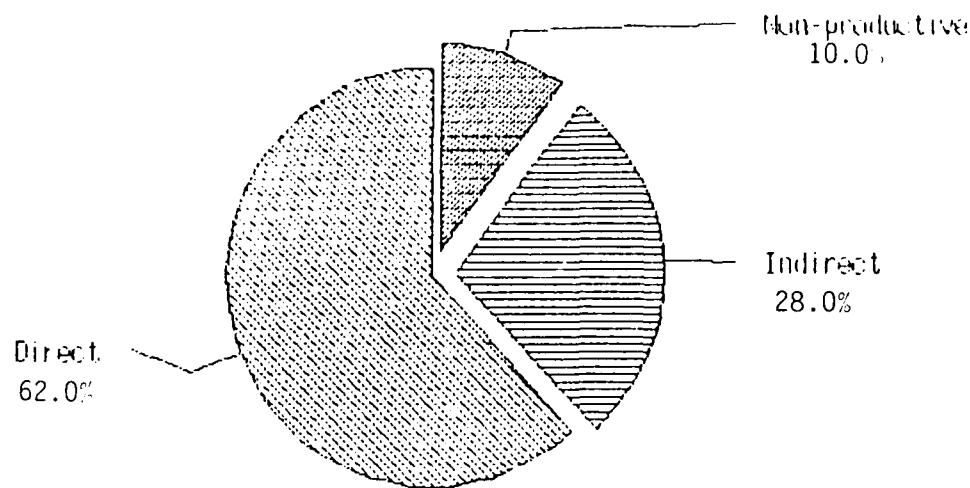
INDIRECT PRODUCTIVITY COMPARISON



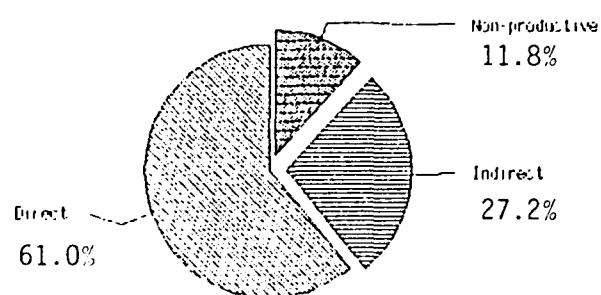
NON-PERIODICITY AND CONVERGENCE



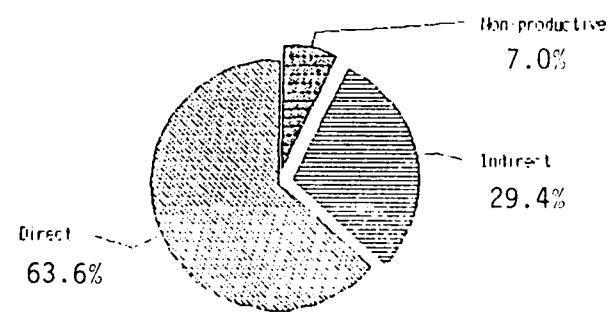
SCHWEINFURT MILITARY COMMUNITY



Buildings and Grounds Division



Utilities Division



PERCENT DISTRIBUTION OF OBSERVATIONS

DEH TOTAL

<u>CATEGORY</u>		<u>PERCENTAGE</u>
100	Productive Craft Time	62.0
200	Indirect Productive	28.0
210	Job Preparation	11.1
211	Receiving Instructions Supervisor	0.7
212	Get and Put Away Tools and Equipment	2.1
213	Layout and Put Away Tools, Equipment, and Material at Job Site	6.2
214	Clean Up Job Site	1.9
215	Personal Clean Up at Job Site	0.2
216	Safety Precautions	0.0
220	Materials Handling	0.7
221	Handling in Shop	0.4
222	Material Pickup in Supply	0.3
230	Travel	11.0
240	Planning	1.5
250	Balancing Delay	0.2
260	Maintenance of Shop Tools and Equipment	0.7
270	Housekeeping	0.5
290	Paperwork	2.2
300	Nonproductive	10.0
310	Personal	8.2
311	Latrine	0.5
312	Idle (Productive Work is Available)	3.6
313	Clean Up and Dressing	0.8
314	Coffee Breaks and Rest Periods	3.3
320	Official	0.0
330	Idle (Not Controlled by Craftsperson, but Controlled by DEH)	0.7
331	Await Transportation	0.1
332	Await Assignment	0.2
333	Await Tools, Material and Equipment	0.2
334	Two Persons on One Person Job	0.2
335	Poor Scheduling	0.0
340	Idle (Not Controlled by DEH) (Awaiting for Other Departments, Divisions, Customers)	1.1
341	Await Other Departments and Divisions	1.1
342	Power/Equipment Failure	0.0
343	Inclement Weather	0.0

PERCENT DISTRIBUTION OF OBSERVATIONS

SCHWEINFURT AREA SHOPS

<u>CATEGORY</u>		<u>PERCENTAGE</u>
100	Productive Craft Time	61.6
200	Indirect Productive	28.4
210	Job Preparation	11.0
211	Receiving Instructions Supervisor	0.7
212	Get and Put Away Tools and Equipment	1.9
213	Layout and Put Away Tools, Equipment, and Material at Job Site	6.6
214	Clean Up Job Site	1.6
215	Personal Clean Up at Job Site	0.3
216	Safety Precautions	0.0
220	Materials Handling	0.7
221	Handling in Shop	0.4
222	Material Pickup in Supply	0.3
230	Travel	11.5
240	Planning	1.7
250	Balancing Delay	0.2
260	Maintenance of Shop Tools and Equipment	0.7
270	Housekeeping	0.3
290	Paperwork	2.3
300	Nonproductive	10.0
310	Personal	8.1
311	Latrine	0.4
312	Idle (Productive Work is Available)	3.1
313	Clean Up and Dressing	1.0
314	Coffee Breaks and Rest Periods	3.7
320	Official	0.0
330	Idle (Not Controlled by Craftsperson, but Controlled by DEH)	0.8
331	Await Transportation	0.1
332	Await Assignment	0.2
333	Await Tools, Material and Equipment	0.3
334	Two Persons on One Person Job	0.2
335	Poor Scheduling	0.0
340	Idle (Not Controlled by DEH) (Awaiting for Other Departments, Divisions, Customers)	1.1
341	Await Other Departments and Divisions	1.1
342	Power/Equipment Failure	0.0
343	Inclement Weather	0.0

PERCENT DISTRIBUTION OF OBSERVATIONS

BAD KISSIGEN SHOPS

<u>CATEGORY</u>		<u>PERCENTAGE</u>
100	Productive Craft Time	63.4
200	Indirect Productive	26.4
210	Job Preparation	11.7
211	Receiving Instructions Supervisor	1.0
212	Get and Put Away Tools and Equipment	3.1
213	Layout and Put Away Tools, Equipment, and Material at Job Site	4.4
214	Clean Up Job Site	3.2
215	Personal Clean Up at Job Site	0
216	Safety Precautions	0
220	Materials Handling	0.6
221	Handling in Shop	0.1
222	Material Pickup in Supply	0.5
230	Travel	9.1
240	Planning	1.1
250	Balancing Delay	0.3
260	Maintenance of Shop Tools and Equipment	0.4
270	Housekeeping	1.3
290	Paperwork	1.9
300	Nonproductive	10.2
310	Personal	8.6
311	Latrine	0.6
312	Idle (Productive Work is Available)	6.0
313	Clean Up and Dressing	0.4
314	Coffee Breaks and Rest Periods	1.6
320	Official	0
330	Idle (Not Controlled by Craftsperson, but Controlled by DEH)	0.4
331	Await Transportation	0
332	Await Assignment	0
333	Await Tools, Material and Equipment	0
334	Two Persons on One Person Job	0.3
335	Poor Scheduling	0.1
340	Idle (Not Controlled by DEH) (Awaiting for Other Departments, Divisions, Customers)	1.2
341	Await Other Departments and Divisions	1.2
342	Power/Equipment Failure	0.0
343	Inclement Weather	0.0

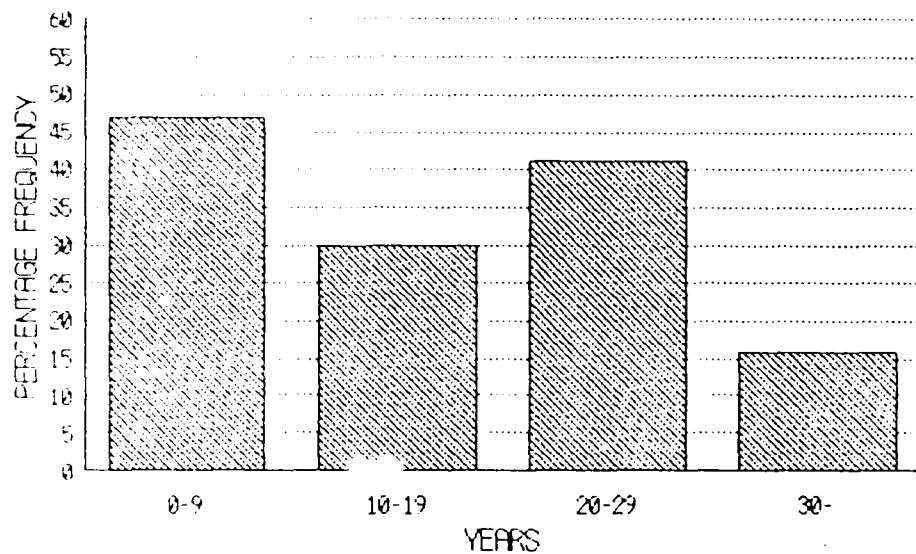
EXHIBIT II-S

DEMOGRAPHIC COMPARISON

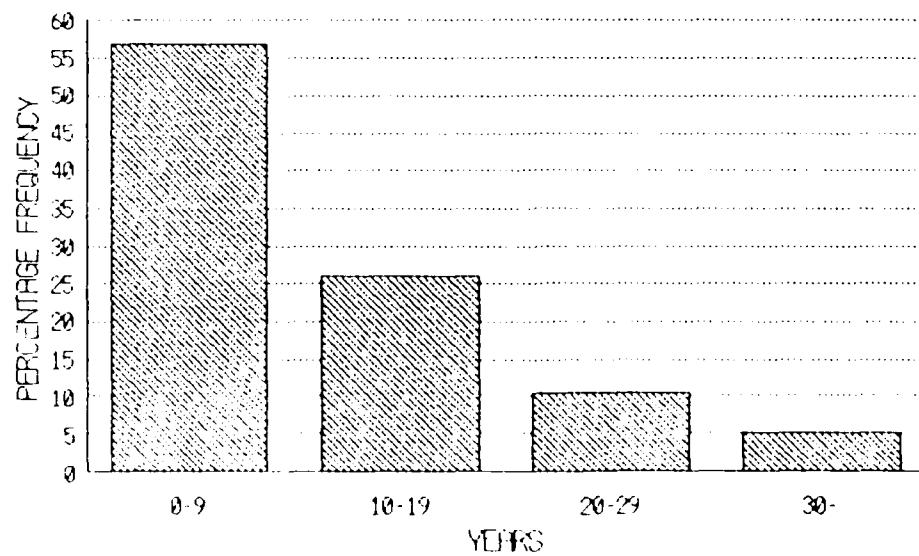
	<u>Schweinfurt</u>	<u>Bad Kissingen</u>
Average Age	38.4	44.3
Average Years of Service	10.4	12.8
Average Worker Wage (Hourly)*	\$6.38	\$6.46

*Burdened wage rate (see Section II, Appendix A, Exhibit II-1)

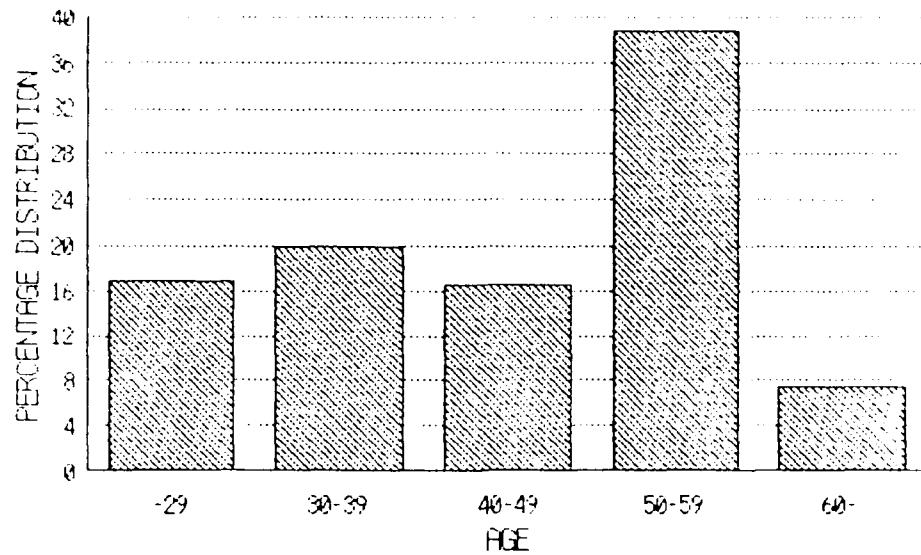
YEARS OF SERVICE -- BAD KISSINGEN



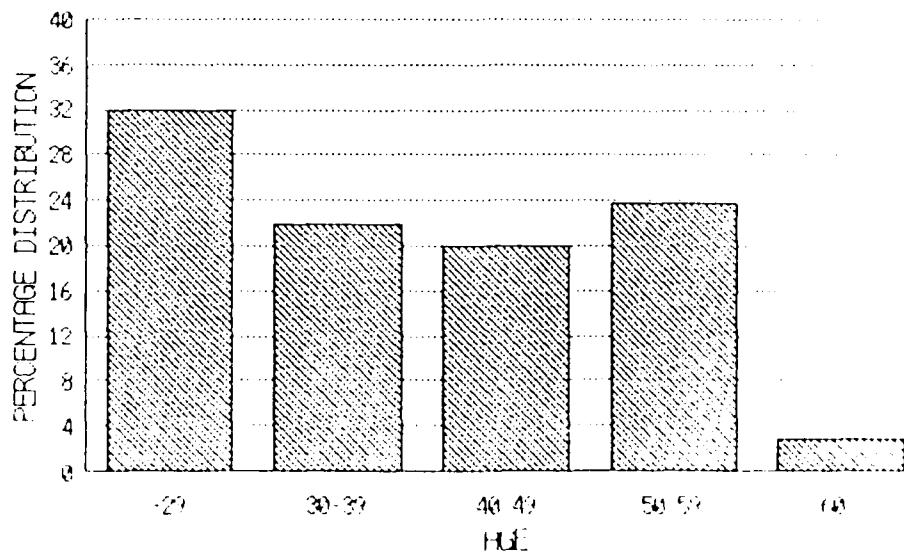
YEARS OF SERVICE -- SCWHEINFURT



AGE DISTRIBUTION -- BAD KISSINGEN



AGE DISTRIBUTION -- SCHWEINFURT



APPENDIX A

SECTION II

DETAILED ANALYSIS OF THE WORK SAMPLING STUDY
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

JULY 1984

APPENDIX A

SECTION II

DETAILED ANALYSIS OF THE WORK SAMPLING STUDY
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
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THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

JULY 1984

II.A DETAILED ANALYSIS OF WORK SAMPLING STUDY

II.A.1 100 Direct Productive - 62.0%

A. Craft Time - 62.0%

(1) This category identifies craft time applied to the performance and ultimate completion of an assigned task or function.

(2) It must be emphasized that the intensive work sampling method does not measure the skill level or performance rate of observed craftspersons. Engineered Performance Standards and/or stopwatch time studies are necessary to determine the efficiency of the craft workforce.

(3) The work sampling results from the Schweinfurt Directorate of Engineering and Housing indicate that for approximately 4 hours and 58 minutes per day (or 62% of craft time) Schweinfurt craftspersons are engaged in directly productive labor leading to the performance or accomplishment of an assigned craft task. While the 62% figure for direct productivity ranks highly among relative figures for facility engineering activities listed in Exhibit II-H, page II-12, we have determined that this productive time can be increased through better management, at all levels, and through improved organizational procedures. Specific recommendations for increased productivity are contained in the balance of this section.

II.A.2 200 Indirect Productive - 28.0%

A. 210 Job Preparation - 11.1%

(1) This subcategory defines the portion of craft time devoted to communication with a shop supervisor or foreman in receiving instructions, obtaining and replacing tools and equipment at the job site, cleaning up refuse or debris resulting from craft activity, personal clean-up at the job site, and time spent taking safety precautions.

(2) The craft time observed in each category is presented in Table II-A-1.

TABLE II-A-1

SUMMARY OF CRAFT TIME SPENT
IN JOB PREPARATION

(Based on 8-Hour Work Day)

		Schweinfurt Minutes	Schweinfurt Percent	Average Minutes	Average Percent	Difference Minutes	Difference Percent
211	Receiving Instructions from Supervisor	3.7	.7	7.2	1.4	(3.4)	(.7)
212	Getting & Putting Away Tools & Equipment	10.1	2.1	11.0	2.2	(.5)	(.1)
213	Handling Tools & Equipment at Job Site	29.7	6.2	17.3	3.6	12.5	2.6
214	Clean Up Job Site	9.1	1.9	5.3	1.1	3.9	.8
215	Personal Clean Up at Job Site	.9	.2	.9	.2	0	0
216	Safety Precautions	0	0	4.3	.9	(4.3)	(.9)

(3) Table II-A-1 shows that in four subcategories (211, 212, 215, 216) Schweinfurt craftspersons are either meeting or surpassing target averages established at other activities. Subcategory 213 - Handling Tools and Equipment at the Job Site and subcategory 214 - Cleaning the Job Site exceed the established average and require further analysis.

(4) Subcategory 213 is 2.6% or 12.5 minutes per day higher than the established average.

(a) An analysis of the work sampling data collected at Schweinfurt revealed an exceptionally large number of 213-observations recorded for buildings and grounds shops, while craftspersons completed independent job or work orders.

At previous activities, craftspersons were observed returning to service vehicles repeatedly for tools, materials, or equipment. Better coordination and anticipation of task requirements by craft personnel helped to reduce the number of tool or material trips. However, the nature of 213-observations at the Schweinfurt Community indicated no wasted productive time due to extended or repetitive tool, material, or equipment handling.

(b) While Schweinfurt's 213-percentage figure is significantly higher than the established average, work sampling results did not suggest that this figure was abnormally or detrimentally high for this DEH activity.

(5) Subcategory 214 is .8% or 4 minutes per day higher than the established average. While job site cleanliness and a debris-free work site are crucially important elements of craft work, the established

average (1.1%) for this subcategory provides sufficient craft time to clean the job site, as observed at previous activities.

(a) Annual savings of \$11,671 (1686 available person hours x .008 time savings x 171 craftspersons x \$5.06¹ unburdened weighted average wage rate) or 2306 person-hours can be realized if Schweinfurt's observed figure for the 214 subcategory can be reduced to the established average.

(6) No significant amount of observed craft time was applied toward the use of safety precautions by craftspersons. The established average for this sub-category is .9% or 4.3 minutes per day per craftsperson.

(a) Problems associated with lack of craftsperson safety are illustrated in Example H and N. A discussion of observed safety procedures is presented in Section V.5.

B. 220 Material Handling - .7%

(1) This category identifies the portion of craft time devoted to material handling at the job site and in the shop.

(2) Schweinfurt craft time spent handling material is 1.5% lower than the established average. While this superior percentage figure must be commended, it does not require further analysis, as work sampling findings did not indicate a problem in this area.

C. 230 Travel Time - 11.0%

(1) This category identifies craft time spent traveling to and from job sites, supply stations, and DEH shops for material, work assignments or lunch.

¹ See Exhibit II-A-6, page II-46, for computation.

(2) The established average of 15.8% for travel is considerably higher (4.7% or 22.6 minutes) than travel time observed at the Schweinfurt Community. While Schweinfurt facility engineers have reduced excessive travel time, observations made during work sampling have led to contradictory conclusions.

(3) On many occasions, craftspersons were observed returning to the DEH facility for lunch. Elimination of this practice would reduce craft travel time and would increase the amount of craft time available for productive work. Table II-A-2 presents a comparative breakdown of average direct productivity start/stop times with Fort Sill, whose overall productivity has been the highest observed. Table II-A-3 shows the time saved if the Schweinfurt Community eliminated return trips to the shop for lunch. Exhibits II-A-2 through II-A-5, pages II-42 through II-45, show graphic illustrations of start/stop observations at Schweinfurt.

TABLE II-A-2
AVERAGE START/STOP TIMES
FIRST AND LAST CODE 100 PRODUCTIVE WORK
(See Also Exhibits II-A-2 to II-A-5)

<u>MORNING</u>	<u>TIME</u>	<u>MORNING</u>	<u>TIME</u>	<u>AFTERNOON</u>	<u>TIME</u>	<u>AFTERNOON</u>	<u>TIME</u>	<u>TOTAL AVG.</u> <u>PRODUCTIVE</u> <u>TIME LOST</u> <u>PER PERSON</u> <u>PER DAY</u>
<u>START</u>	<u>LOST</u>	<u>STOP</u>	<u>LOST</u>	<u>START</u>	<u>LOST</u>	<u>STOP</u>	<u>LOST</u>	
* * * SCHWEINFURT MILITARY COMMUNITY * * *								
0748	18	1148	12	1239	9	1530	30	69
* * * FORT SILL * * *								
0751	21	1117	13	1205	5	1538	22	<u>61</u>
Difference								8

TABLE II-A-3
RECOMMENDED START/STOP TIMES
ELIMINATION OF RETURN TRIPS FOR LUNCH

MORNING START	TIME LOST	MORNING STOP	TIME LOST	AFTERNOON START	TIME LOST	AFTERNOON STOP	TIME LOST	TOTAL AVG. PRODUCTIVE TIME LOST PER PERSON PER DAY
0748	18	1155	5	1235	5	1530	30	58

(4) Table II-A-3 above shows that 11 minutes (2.29%) of craft time can be regained for productive purposes, if craftspersons ate lunch at the job site. A five-minute pre-lunch buffer is reserved for clean-up and lunch preparation (SOP: Normal Duty Hours, Standing Work Attendance Regulations, and Absence From Duty, Sept. 20, 1983, Schweinfurt MILCOM), while a five minute post-lunch break provides time to prepare for further craft work. Of the 58 craftspersons observed, 36 or 62% left the job site and returned to a shop or sub-shop (Conn Barracks, Askren Manors, Ledward Barracks) for lunch. If all craftspersons were required to eat on the job site a total savings of \$20,712 (1686 available local national personhours x .0229 time % per day x .62 of the work force x 171 total work force x \$5.06 average unburdened wage rate) or 4093 more person hours (available for productive work) could be realized annually. The total craft time recovery per person per day would be 1.4% (.62 of the work force x .0229 time saving).

(5) Table II-A-3 also illustrates an average loss of 30 minutes each day due to early termination of productive work. A large portion of the time at a day's end is consumed with activities discussed later in this section (paperwork, personal cleanup, maintenance of tools and equipment, etc.), hence an analysis of the entire 30 minute period would be incomplete at this point.

(6) Finally, the inadequacy of vehicles available to Schweinfurt DEH craftspersons is not reflected by the below-average craft travel figure of 11.0%. On several occasions, craftspersons were observed making repetitive trips to the DEH shop or subshops, to obtain materials or supplies. Repetitive shop trips lead to needless travel time and loss of direct productivity. Lack of vehicles also forced certain craftspersons to be dropped off and picked up by foremen, work leaders or other craftspersons using the sole or few vehicles available. Observations of acutely inadequate transportation can be found in Examples B, C, and D. Further evidence of poor vehicular support can be found throughout the rest of the findings of fact examples.

D. 240 Planning On the Job Site - 1.5%

(1) This category identifies time that is devoted by the craftsperson in understanding and planning task requirements at the job site. This activity may consist of studying the job site, reading drawings and sketches, making calculations, or discussing the task with other craftspersons.

(2) The Schweinfurt percentage of 1.5% job site planning is lower than the established average. One factor attributable to Schweinfurt's superior performance in this area may be supply of information to the craftsperson in the field, which is sufficient to do task assignments without further job site planning.

E. 250 Balancing Delay - 0.2%

(1) This category identifies areas where one craftsperson is idle while waiting on another to accomplish a function. Balancing delays occurs when two craftspersons are required to perform a task assignment,

but must at times work alternately due to a lack of space or safety requirements.

(2) Schweinfurt's figure of 0.2% is well below the established average and indicates effective scheduling and worker assignments by shop floor management.

F. 260 Maintenance of Shop Tools and Equipment- 0.7%

(1) This category reflects the time required of craftspersons to insure that tools and equipment are functioning properly.

(2) Work sampling results for the Schweinfurt Community indicate an excess of 0.3% over the established average of 0.4%. While maintenance of shop tools and equipment is essential to the proper functioning of craft equipment, abuse of craft time in this area is detrimental to direct productivity. The 0.4% established average is considered sufficient for proper tool and equipment maintenance.

(3) The nature of the work sampling procedures employed by E. L. HAMM & ASSOCIATES does not permit an evaluation of worker efficiency or labor quality. Similarly, an evaluation of the condition, age or quality of craft equipment and tools is not produced through work sampling. Yet the possibility exists that excessive craft time spent in maintenance of tools and equipment results due to aged or poor quality tools and equipment.

(4) Providing that tools and equipment are sufficient and of acceptable quality, reduction to the established average in this area would result in annual savings to the Schweinfurt DEH of \$4,376 (1686 x .003 x 171 x \$5.06) or 865 person hours for productive purposes.

G. 270 Housekeeping - 0.5%

(1) This category identifies craft time spent cleaning the shop work area and equipment.

(2) While Schweinfurt's figure of 0.5% only minimally exceeds the established average of 0.4%, savings of \$1,458 ($1686 \times .001 \times 171 \times \5.06) or 288 person hours annually can be realized with improved shop floor management of craft time in this area.

H. 290 Paperwork - 2.2%

(1) This category includes the time expended to fill out service orders, supply requisitions, and other miscellaneous documents.

(2) The Schweinfurt figure for this category exceeds the established average of 1.7%. Analyses of work sampling data has revealed excessive amounts of craft time spent on paperwork. On one day, craftspersons spent approximately 30 to 40 minutes determining material requirements for service orders -- a task which should be shop floor management's responsibility (see Example L). At another shop, craftspersons spent time at the end of the day trying to recall the material and work charged to service orders during the day. Labor and equipment paperwork should be accomplished immediately upon completion of each service order to avoid confusion and wasted time at the day's end.

(a) Reducing the observed figure in this category to the established average will result in annual savings of \$7,294 ($1686 \times .005 \times 171 \times \5.06) or 1441 person hours.

II.A.3 300 NONPRODUCTIVE - 10.0%

A. 310 Personal - 8.2%

This category identifies the portion of nonproductive time that can be directly attributed to the initiative of the craftsperson such as

washroom, cleanup and dressing, coffee breaks, rest periods, and idle time. Table II-A-4 presents the 310 category and its subcategories.

TABLE II-A-4
SUMMARY OF PERSONAL NONPRODUCTIVE TIME

<u>Code</u>	<u>Description</u>	<u>Schweinfurt</u>		<u>Average</u>		<u>Difference</u>	
		<u>Minutes</u>	<u>Percent</u>	<u>Minutes</u>	<u>Percent</u>	<u>Minutes</u>	<u>Percent</u>
311	Latrine	2.4	.5	1.9	.4	.5	.1
312	Idle	17.3	3.6	23.0	4.8	(5.7)	(1.2)
313	Cleanup and Dressing	3.8	.8	9.1	1.9	(5.3)	(1.1)
314	Coffee Breaks and Rest Periods	15.8	3.3	16.3	3.4	(0.5)	(0.1)

(2) Table II-A-4 indicates only a slight excess of .1% in subcategory 311 -- use of latrine facilities. Obviously, this is a somewhat uncontrollable variable.

(3) Overall, Schweinfurt's performance in the personal nonproductive category is superior to the established average, and should be so noted.

B. 320 Official - 0.0%

(1) The official time category covers craft time devoted to meetings, blood donations, required physicals and other miscellaneous administrative requirements.

(2) No significant time was spent in this category during the work sampling study of E. L. HAMM & ASSOCIATES.

C. 330 Idle - Not Controlled by Craftsperson - 0.7%

(1) This category identifies time where, through some fault of the DEH management, the craftsperson is nonproductive. While it is the opinion of E. L. HAMM & ASSOCIATES that this should never be a problem, in all actuality, the craftsperson is hindered by extraneous influences. When compared to the established average of 6.7%, the Schweinfurt DEH is performing exceptionally well in this area. Table II-A-5 presents the work sampling findings in each category.

TABLE II-A-5
SUMMARY OF IDLE TIME NOT CONTROLLED BY THE CRAFTSPERSON

<u>Code</u>	<u>Description</u>	<u>Schweinfurt</u>		<u>Average</u>		<u>Difference</u>	
		<u>Minutes</u>	<u>Percent</u>	<u>Minutes</u>	<u>Percent</u>	<u>Minutes</u>	<u>Percent</u>
331	Await Transportation	.3	.1	21.6	4.5	(21.3)	(4.44)
332	Await Assignment	.9	.2	11.5	2.5	(11.1)	(2.3)
333	Await tools or materials	.9	.2	2.9	0.6	(2.0)	(0.4)
334	Two persons on a one person job	.9	.2	24.5	5.1	(23.6)	(4.9)
335	Poor scheduling	.2	.04	4.3	.9	(4.1)	(.86)

D. 340 Idle - Not Controlled by DEH - 1.1%

(1) This category identifies the portion of craft time lost to idleness, due to factors outside the control of the DEH. Table II-A-6 presents the sub-category breakdown for this area.

TABLE II-A-6
SUMMARY OF IDLE TIME NOT CONTROLLED BY DEH

Code	Description	Schweinfurt		Average		Difference	
		Minutes	Percent	Minutes	Percent	Minutes	Percent
341	Awaiting Other Departments	5.3	1.1	6.2	1.3	(.9)	(.2)
343	Inclement Weather	0.0	0.0	1.4	.3	(1.4)	(.3)

(2) Code 341 covers the event that a craftsperson is dispatched to a housing unit or barracks facility and spends craft time trying to locate a resident or person in charge.

(3) While problems incurred by temporary absences of contact persons are generally outside the influence of the DEH, work reception should pursue two objectives; (1) ask the appropriate questions as to contact time and place and how to locate contact individuals, (2) impress upon each customer the importance of their availability to and cooperation with the craftsperson.

II.A.4 SUMMARY AND RECOMMENDED OBJECTIVES

(a) Based on the results of this work sampling study and a comparative analysis to the average of several other DEH activities, (see Table II-5), the following productivity objectives are considered reasonable.

	<u>Percent</u>	<u>Time</u>
Productive	65.1	5 h 13 m
Indirect Productive	24.9	1 h 59 m
Nonproductive	<u>10.0</u>	<u>0 h 48 m</u>
	100.0	8 hours

(b) These projected figures are calculated by adjusting categories that exceeded the established average downwardly, to meet that average. Those categories which already meet or better the average are not adjusted in any fashion. In the opinion of HAMM ASSOCIATES, some categories such as 312-Idle could fluctuate upward with the reduction in clean-up and maintenance time which is recommended. It is not possible to predict percentage fluctuations based on the available data. While it is believed that a 65.1% productive rate is achievable at the Schweinfurt DEH some downward adjustment may be expectable.

(c) Results of work sampling have shown Schweinfurt to be superior in most categories to the average established by HAMM & ASSOCIATES research and data collection. Schweinfurt's performance is commendable overall. Areas of improvement have been adjusted to established averages for purposes of determining a conservative estimate for cost avoidance in these areas. However, meeting the established average is "average" only and does not reflect superior performance.

(d) It should be noted that 65.1% is the projected goal if all craftspersons eat on the job site. An increase of 1.4% is projected in productive work if this policy is adopted. If craftspersons are allowed to continue the practice of returning to shops or subshops for lunch, this projected figure would be as shown below:

	<u>Percent</u>	<u>Time</u>
Productive	63.7	5 h 6 m
Indirect Productive	26.3	2 h 6 m
Nonproductive	<u>10.0</u>	<u>0 h 48 m</u>
	100.0	8 hours

The total recommended adjustments are presented in Table II-A-7.

TABLE II-A-7
TIME PERCENTAGE ADJUSTMENTS

CATEGORY	CURRENT %	CURRENT TIME	PROPOSED %	PROPOSED TIME	DELTA %	DELTA TIME
100	62.0	4h 58m	65.1	5h 13m	+3.1	+15m
214	1.9	0h 9m	1.1	0h 5m	- .8	- 4m
230	11.0	0h 53m	9.6	0h 46m	-1.4	- 7m
260	.7	0h 3m	.4	0h 2m	- .3	- 1m
270	.5	0h 2m	.4	0h 2m	- .1 Fractional	
290	2.2	0h 11m	1.7	0h 8m	- .5	- 3m

The target of 65.1% direct productive time is an attainable goal if the DEH management institutes the procedural changes suggested in this and subsequent sections of this report. Mere familiarization with the problems and suggested solutions will not implement the changes. The blue-collar workforce must be informed of the problem areas, the goals set, and the influences or changes they can implement to attain these goals.

The most significant improvement in productivity will result from eating on the job site. This procedural change will save 1.4% or 7 minutes of craft time per person per day for a total annual cost avoidance of \$20,712. While this is not a common practice at other activities, Fort Sill and 15 of 16 private commercial activities in the Tidewater, Virginia area have their work forces eat on the job site. The commercial firms included air conditioning/heating shops, carpentry, electrical, plumbing, painting and general contractors.

Exhibit II-A-1, page II-41, illustrates graphically what the anticipated savings would be if the 65.1% goal is obtained. The actual annual cost avoidance in Exhibit II-A-1 is \$45,511 and was realized from five categories shown below in Table II-A-8.

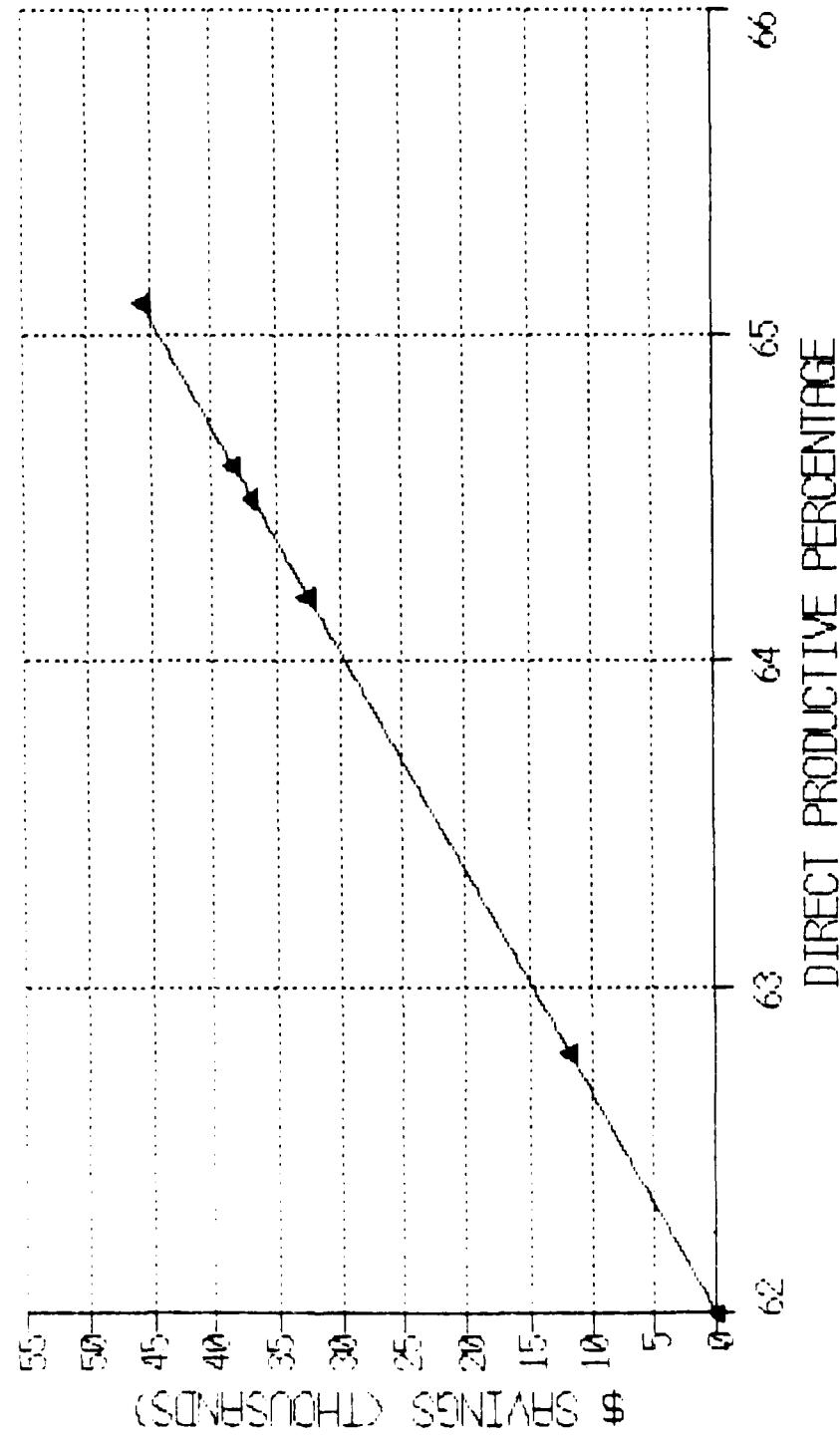
TABLE II-A-8
DISTRIBUTION OF COST AVOIDANCE BY CATEGORY

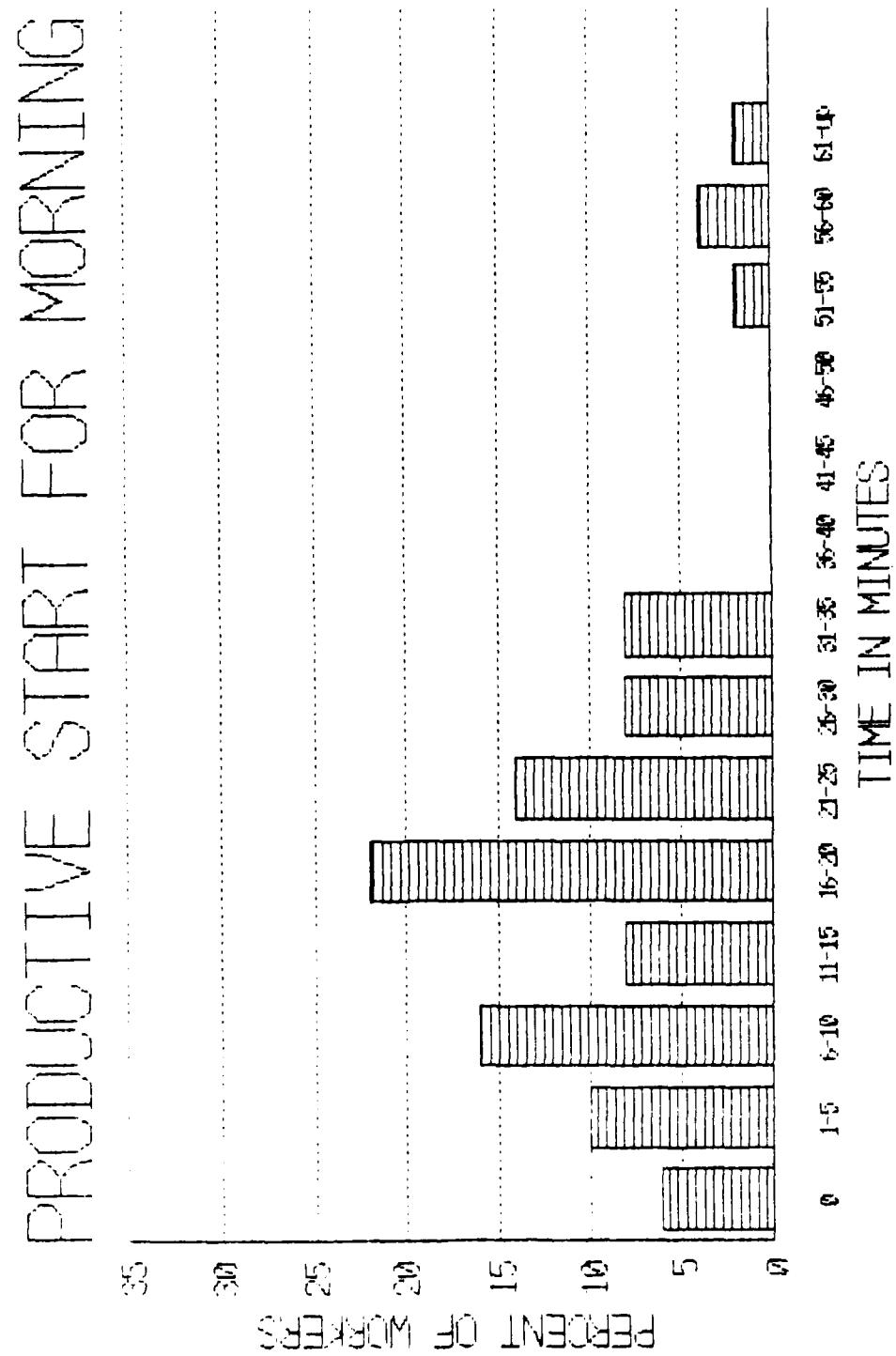
<u>CATEGORY</u>	<u>PERCENT CHANGE</u>	<u>COST AVOIDANCE</u>
214	- .8	\$11,671
230	-1.4	20,712
260	- .3	4,376
270	- .1	1,458
290	- .5	7,294
		<u>\$45,511</u>

NOTE: See Exhibit II-A-7, beginning on page II-56, for a graphical presentation of the above table.

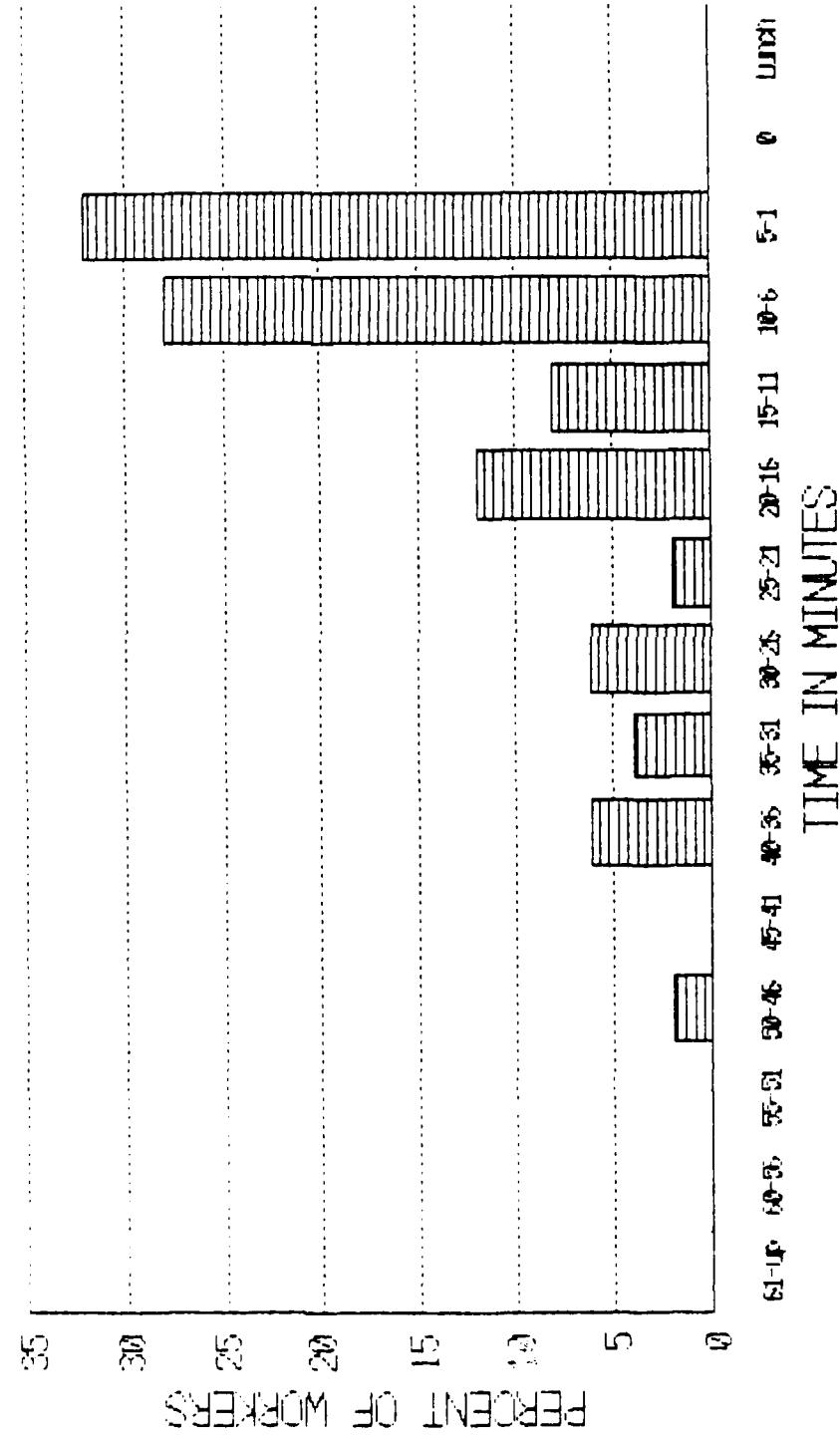
Exhibit II-A-7, beginning on page II-56, contains Examples A through O that present daily recounts of observations made during the course of this study, with conclusions and recommendations that will assist in improving Schweinfurt's productive time to 65.1%. No attempt is made to place any individual on report or any particular shop under scrutiny. These examples are findings of fact and are used solely as factual support for conclusions drawn and recommendations made by E. L. HAMM & ASSOCIATES.

PROJECTED COST AVOIDANCE

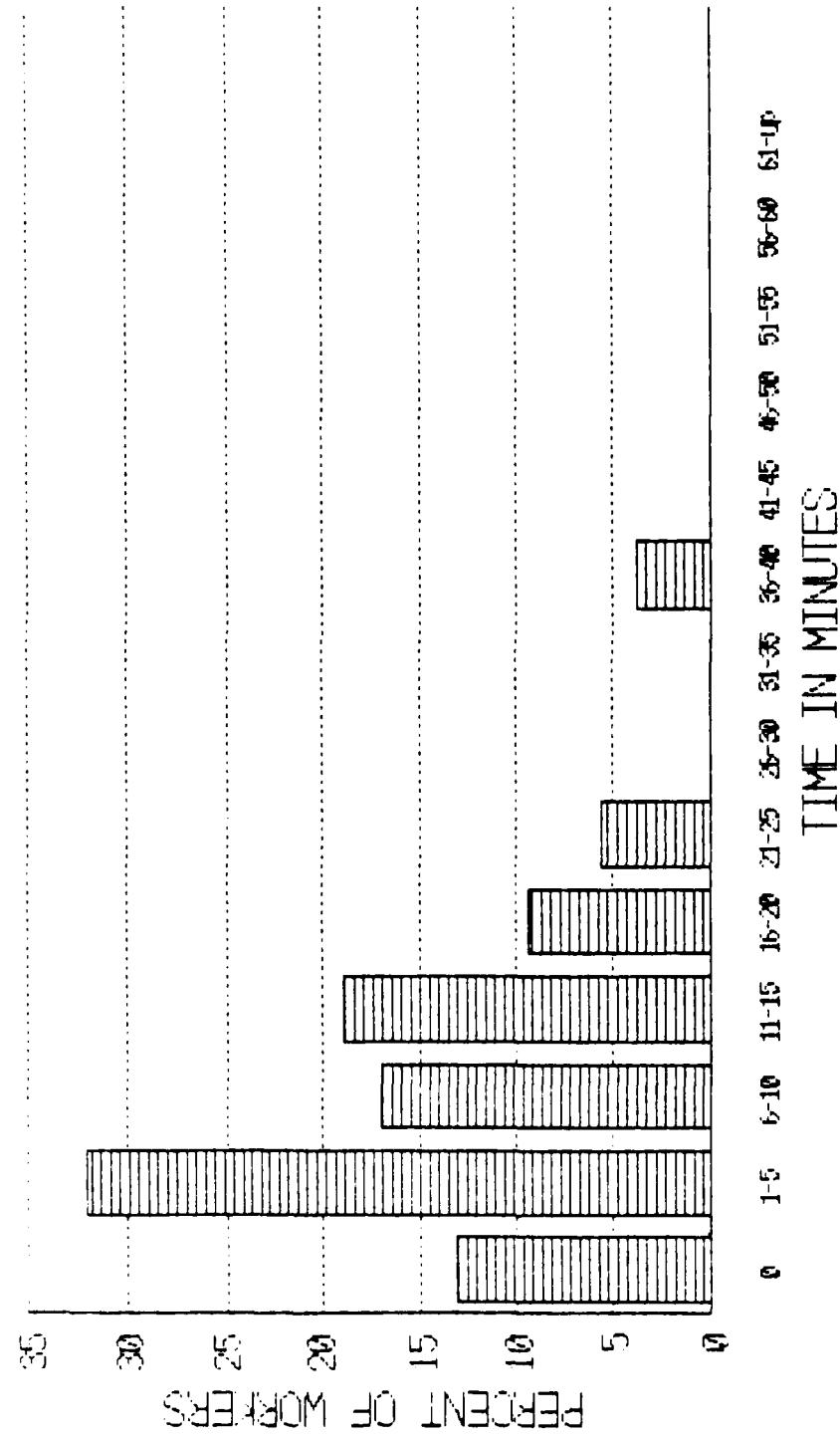




PRODUCTIVE STOP FOR MORNING



PRODUCTIVE START FOR AFTERNOON



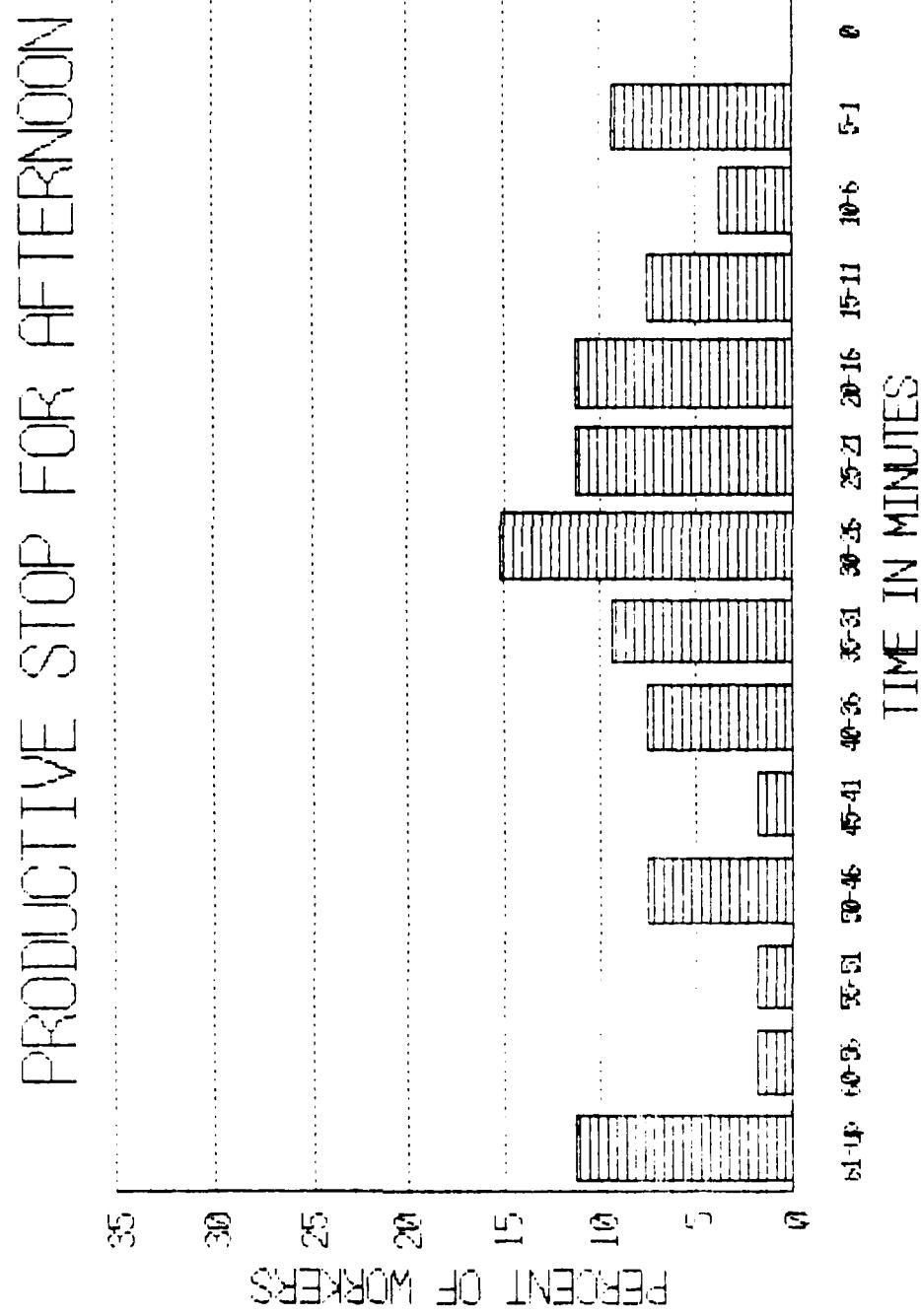


EXHIBIT II-A-6

COMPUTATION OF AVERAGE WORKER WAGE
SCHWEINFURT (LESS BAD KISSINGEN)

<u>SECTION</u>	<u>GRADE¹</u>	<u>NO.</u>	<u>(DM) COST</u>
<u>Carpentry/Masonry</u>			
Carpenter Leader	A-4/6	1	33,039
Carpenter	A-4/6	4	120,141
Carpenter	A-4/5	1	27,789
Glazier	A-4/6	1	30,035
Mason Leader	A-4/6	1	30,035
Mason	A-4/6	5	150,176
Mason	A-4/5	1	27,789
Roofers	A-4/6	3	90,106
		17	509,110
<u>Preventive Maintenance</u>			
Carpenter	A-4/6	4	120,141
Plumber	A-4/6	4	120,141
Plumber	A-4/5	1	27,789
Electrician	A-4/6	3	90,106
Electrician	A-4/5	1	27,789
		13	385,966
<u>Metal Working</u>			
Metal Worker Leader	A-4/6	1	33,039
Metal Worker	A-4/6	4	120,141
Sheet Metal Mechanic	A-4/6	3	90,106
		8	243,286
<u>Painting</u>			
Painter Leader	A-4/6	1	33,039
Sign Painter	A-4/6	1	30,035
Painter	A-4/6	3	90,106
Painter	A-4/5	1	27,789
		6	180,969
<u>Preventive Maintenance</u>			
Paver Leader	A-4/6	1	33,039
Road Worker	A-4/4	2	54,163
Road Rep. Helper	A-4/3	1	25,646
Paver	A-4/6	1	30,035
Road Sweeper Oper.	A-5/5	1	25,147
Eng. Eq. Opr.	A-4/5	1	27,789
Railroad Trackman	A-4/4	1	27,082
		8	222,901

EXHIBIT II-A-6 (continued)

<u>SECTION</u>	<u>GRADE¹</u>	<u>NO.</u>	<u>(DM) COST</u>
<u>Improved/Unimproved Grounds</u>			
Engr. Eq. Leader	A-4/6	1	33,039
Engr. Eq. Operator	A-4/6	2	60,074
Motor Vehicle Opr.	A-5/5	1	25,147
Gardener (Trac. Opr.)	A-2/5	3	75,442
Gardener	A-2/5	1	25,147
Gardener	A-2/3	3	69,576
		TT	288,425
<u>Pest Control</u>			
Pest Controller Leader	A-2/6	1	29,241
Pest Controller	A-2/5	1	25,147
		2	54,388
<u>Engr. Org. Maint.</u>			
Heavy Mob Eq M Leader	A-3/6	1	28,989
Heavy Mob Eq Mech	A-3/6	4	105,414
Heavy Mob Eq Mech	A-3/5	1	24,107
		6	158,510
<u>Refr & A/C</u>			
Air Cond Eq M Leader	A-4/6	1	33,039
Air Cond Eq Mech	A-4/6	1	30,035
Kitch Eq Mech	A-4/6	2	60,070
		4	123,144
<u>Boiler Plant</u>			
Boiler Pl Oper Leader	A-3/5	1	26,518
Boiler Pl Oper	A-3/5	9	216,965
		10	243,483
<u>Heating Syst MT</u>			
Heatg Eq Mech Leader	A-4/6	1	33,039
Heatg Eq Mech	A-4/6	4	120,141
Heatg Eq Mech	A-4/5	1	27,789
		6	180,969

EXHIBIT II-A-6 (continued)

<u>SECTION</u>	<u>GRADE¹</u>	<u>NO.</u>	<u>(DM) COST</u>
<u>Plumbing & Steamfitting</u>			
Plumber Leader	A-4/6	1	33,039
Plumber	A-4/6	6	180,211
Plumber	A-4/5	1	27,789
Pipefitter Leader	A-4/6	1	30,035
Pipefitter	A-4/6	5	150,176
		<u>14</u>	<u>421,250</u>
<u>Elec Sys Maint</u>			
Electrician Leader	A-4/6	1	33,039
Electrician	A-4/6	6	180,211
Electrician Eq Rep	A-4/6	<u>1</u>	<u>30,035</u>
		<u>8</u>	<u>243,285</u>
<u>Ext Water/Maint Unit</u>			
Plumber	A-4/6	<u>2</u>	<u>60,070</u>
		<u>2</u>	<u>60,070</u>
<u>Sewage Maint</u>			
Motor Veh Op Leader	A-5/5	1	27,662
Ind Cleaner	A-1/3	2	42,182
Motor Veh Opr	A-5/5	3	75,442
Ind Cleaner	A-1/3	<u>3</u>	<u>63,274</u>
		<u>9</u>	<u>208,560</u>
GRAND TOTAL		124	3,524,316
TOTAL U.S. DOLLARS ²			\$1,300,486
Total Workers			divided by <u>124</u>
Hours per Man Year			
Average Hourly Wage (SMC) ³			divided by <u>2080</u> <u>\$5.04</u>

1 In computing the Avg. Hourly Wage, actual pay grades were obtained from the 13 July 1984 Roster of Personnel.

2 To convert DM to U.S. dollars, the conversion rate of \$1.00 = DM2.71 for FY84 was used.

3 To calculate the Average Hourly Wage burdened at Schweinfurt for fringe benefits, a factor of 31.0% (per Defense Cost Office) may be added. The resultant burdened Average Hourly Wage for SMC is \$6.60.

EXHIBIT II-A-6 (continued)

COMPUTATION OF AVERAGE WORKER WAGE
BAD KISSINGEN

<u>SECTION</u>	<u>GRADE</u>	<u>NO.</u>	<u>(DM)</u> <u>COST</u>
<u>Carpentry/Masonry</u>			
Carpenter Leader	A-4/6	1	33,039
Carpenter	A-4/6	1	30,035
Carpenter	A-4/5	2	55,578
Mason	A-4/6	2	60,070
Roofers	A-4/6	2	60,070
		<u>8</u>	<u>238,792</u>
<u>Preventive Maintenance</u>			
Carpenter	A-4/6	2	60,070
Plumber	A-4/6	2	60,070
Plumber	A-4/5	1	27,789
Electrician	A-4/6	2	60,070
Electrician	A-4/5	1	27,789
Maint Mechanic	A-4/5	1	27,789
		<u>9</u>	<u>263,577</u>
<u>Metal Working</u>			
Metal Worker	A-4/6	<u>2</u>	<u>60,070</u>
			<u>60,070</u>
<u>Painting</u>			
Painter	A-4/6	<u>2</u>	<u>60,070</u>
			<u>60,070</u>
<u>Preventive Maintenance R/R</u>			
Paver Leader	A-4/6	1	33,039
Road Repairer	A-4/5	1	27,789
Road Repairer	A-4/3	1	25,646
Road Worker	A-4/4	1	27,082
Eng. Eq. Opr.	A-4/6	2	60,070
		<u>6</u>	<u>173,626</u>
<u>Engr. Org. Maint.</u>			
Heavy Mob Eq Mech	A-3/6	1	26,354
Heavy Mob Eq Mech	A-3/5	1	24,107
		<u>2</u>	<u>50,461</u>

EXHIBIT II-A-6 (continued)

<u>SECTION</u>	<u>GRADE</u>	<u>NO.</u>	<u>(DM) COST</u>
<u>Improved/Unimproved Grounds Unit</u>			
Gardener (semi-sk)	A-2/3	1	23,192
Engr Eq Opr	A-4/5	1	27,789
		2	50,981
<u>Pest Control</u>			
Pest Controller	A-2/5	1	25,147
		1	25,147
<u>Heating Syst MT</u>			
Heatg Eq Mech	A-4/5	1	27,789
		1	27,789
<u>Plumbing & Steamfitting</u>			
Plumber Leader	A-4/6	1	33,039
Plumber	A-4/6	4	120,141
Pipefitter	A-4/6	2	60,070
		7	213,250
<u>Elec Sys Maint</u>			
Electrician Leader	A-4/6	1	33,038
Electrician	A-4/6	3	90,106
		4	123,144
<u>Ext Water & Sewer Maint Unit</u>			
Ind Cleaner	A-1/3	2	42,182
Motor Veh Opr	A-5/5	1	25,147
		3	67,329
GRAND TOTAL		47	1,354,236
TOTAL U.S. DOLLARS			\$499,718
Total Workers (BK)			47
Hours per Man Year			\$10,632
Average Hourly Wage (BK)			2080
			\$5.11

4 To calculate the Average Hourly Wage burdened at Bad Kissingen for fringe benefits, a factor of 31.0% (per Defense Cost Office) may be added. The resultant burdened Average Hourly Wage for SMC is \$6.69.

EXHIBIT II-A-6 (continued)

AVERAGE WORKER WAGE - SUMMARY

	<u>Total Employees</u>	<u>Total U.S. Dollars</u>
SMC	124	\$1,300,486
Bad Kissingen	47	499,718
	<u>171</u>	<u>\$1,800,204</u>
Average Yearly Pay		\$10,528
Hours per Man Year	divided by	<u>2,080</u>
Average Hourly Wage (Total) ⁵		\$5.06
Percent of Total Labor Dollars Available for Productive Work [(1686/2080) x (1,800,204)]		\$1,459,204
Total Workers (Total)	divided by	<u>171</u>
		\$8,533
Hours per Man Year	divided by	<u>2,080</u>
Annualized Average Hourly Wage ⁶		\$4.10

5 To calculate the Average Hourly Wage burdened for fringe benefits, a factor of 31.0% (per Defense Cost Office) may be added. The resultant burdened Average Hourly Wage for both SMC and BK is \$6.63.

6 The Average Hourly Wage represents the wage or salary a craftsman would receive throughout the course of a year's employment, even during vacation and sick leave. Of the 2,080 hours (40 hours x 52 weeks) per man year used in calculating that wage, only 1,686 hours (approximately 81%) are available for on-site work. The Annualized Average Hourly Wage represents the available productive wage spread over a 12 month period.

APPENDIX B
SECTION II
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF FACILITIES ENGINEERING
AT
THE SCHWEINFURT SUB-FACILITY
BAD KISSINGEN

* * * WORK SAMPLING ANALYSIS * * *

APPENDIX B
SECTION II
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF FACILITIES ENGINEERING
AT
THE SCHWEINFURT SUB-FACILITY
BAD KISSINGEN

* * * OVERVIEW OF THE WORK SAMPLING ANALYSIS * * *

II.B GENERAL OVERVIEW OF THE WORK SAMPLING ANALYSIS

As a detailed analysis of the work sampling data has been presented in the preceding Appendix A, a similar analysis of observations taken specifically at Bad Kissingen would be repetitious. A general overview, identifying observed data trends, would be more helpful in outlining possible problems areas in Bad Kissingen's DEH structure. While the sample size of observations taken at Bad Kissingen (2265) is sufficient to make statistically valid analysis and recommendations, it is the opinion of E. L. HAMM & ASSOCIATES that organizational ties with the main Schweinfurt DEH are too closely interrelated for separation into distinct detailed statistical analysis.

II.B.1 100 Direct Productive - 63.4%

A. Craft Time - 63.4%

(1) This category identifies craft time applied to the performance and ultimate completion of an assigned task or function.

(2) The work sampling results from the Schweinfurt sub-Facility Bad Kissingen indicate that for approximately 5 hours and 4 minutes per day (or 63.4% of craft time) Bad Kissingen craftspersons are engaged in directly productive labor leading to the accomplishment of an assigned responsibility. While Bad Kissingen's direct productivity is high in

relation to Schweinfurt and the other facilities listed in Exhibit II-H, page II-12, direct productivity can be improved by better management and attention to those problem areas identified by this overview. Specific analysis and recommendations for improvement are contained in Section II and Appendix A.

II.B.2 200 Indirect Productive - 26.4%

(1) This major category identifies any activity performed that renders assistance or preparation for the productive portion of a task. It is necessary or required work that does not alter the composition, condition, conformation or construction of an item.

(2) The craft time observed in each category and sub-category is presented in Table II-B-1.

TABLE II-B-1

SUMMARY OF CRAFT TIME SPENT
IN INDIRECT PRODUCTIVITY

<u>Code</u>	<u>Description</u>	<u>BK Percent</u>	<u>Avg. Percent</u>	<u>Difference Percent</u>
210	Job Preparation	11.7	9.5	(2.2)
211	Receiving Instructions from Supervisor	1.0	1.5	.5
212	Handling tools and Equipment in Shop	3.1	2.3	(.8)*
213	Handling tools and Equipment at Job Site	4.4	3.6	(.8)*
214	Clean-up Job Site	3.2	1.1	(2.1)*
215	Personal clean-up at Job Site	0	.2	.2
216	Safety Precautions	0	.9	.9
220	Material Handling	.6	2.2	1.6
221	In Shop	.1	1.3	1.2
222	In Supply	.5	.6	.1
230	Craft Travel	9.1	15.8	6.7
240	Job Site Planning	1.1	1.9	.8
250	Balancing Delay	.3	1.4	1.1
260	Tool and Equipment Maintenance	.4	.4	0
270	Housekeeping	1.3	.4	(.9)*
290	Paperwork	1.9	1.7	(.2)*

(2) The asterisks in Table II-B-1 indicate excessive amounts of indirect productive craft time spent in these areas. Virtually all of the areas in which Bad Kissingen exceeds the established average are also problem areas for the Schweinfurt DEH. The detailed analysis of Appendix A to Section II gives specific recommendations and analyses for these categories.

(3) The findings for Bad Kissingen in sub-categories 213, 214, 270 and 290 support the analysis of Appendix A and also suggest that the problems in these areas are inherent to the managerial structure of Schweinfurt's DEH overall.

II.B.3 300 Nonproductive - 10.2%

(1) This major category identifies circumstances either controllable or uncontrollable by the Directorate of Engineering that does not contribute directly or indirectly to the accomplishment of a craft task.

(2) The craft time observed in each category and subcategory is presented in Table II-B-2.

TABLE II-B-2

SUMMARY OF CRAFT TIME SPENT IN NON-PRODUCTIVITY

<u>Code</u>	<u>Description</u>	<u>BK Percent</u>	<u>Avg. Percent</u>	<u>Difference Percent</u>
310	Personal	8.6	10.5	1.9
311	Restroom	.6	.4	(.2)*
312	Idle	6.0	4.8	(1.2)*
313	Clean-up	.4	1.9	1.5
314	Breaks	1.6	3.4	1.8
320	Official	0	.9	.9
330	Idle - Not Controlled by Craftsperson	.4	6.8	6.4
331	Await Transportation	0	4.5	4.5
332	Await Assignment	0	2.5	2.5

<u>Code</u>	<u>Description</u>	<u>BK Percent</u>	<u>Avg. Percent</u>	<u>Difference Percent</u>
333	Await Tools, Materials	0	.6	.6
334	Two Persons on a One Person Job	.3	5.1	4.8
335	Poor Scheduling	.1	.9	.8
340	Idle - Not Controlled by DEH	1.2	1.4	.2
341	Await Other Departments	1.2	1.3	.1
343	Inclement Weather	0	.3	.3

(2) The asterisks in Table II-B-2 indicate excessive amounts of nonproductive time being spent in these areas.

(3) The excessive 311 time is somewhat difficult to control and is therefore considered an absolute figure.

(4) The observations for idle time attributable to the craftsperson (312) exceeds the average by 1.2% and should draw closer attention by shop floor management. However, the figure for official break time (1.6%) is abnormally low. Official allocated break time is 20 minutes or 4.2% of craft time. During this observation period at Bad Kissingen, very few craftspersons were observed taking breaks. It is quite possible that 312 - idle time would shift to 314 - break time when craftspersons at Bad Kissingen are not being observed.

EXAMPLE A

FINDINGS OF FACT

SHOP: Electric - One Worker

1230 - 1232 Handling material in shop
1234 - 1246 Travel to remote site T-149
1248 Waiting for escort
1250 Travel to converter shed
1252 - 1322 Performing preventive maintenance on converter
1324 - 1326 Loading tools back on truck
1328 - 1334 Performing preventive maintenance on second converter
1336 Travel back to gate
1338 - 1340 Waiting for guard to open gate
1342 - 1348 Travel to Bldg. 74 - Conn Barracks
1350 - 1406 Performing maintenance on emergency generator
1408 Putting away tools and equipment
1410 - 1412 Travel to Firehouse for key to water pump facility
1414 - 1416 Performing maintenance on emergency generator
1418 Return to truck for material
1420 - 1424 Maintenance on emergency generator
1426 - 1436 Travel back to Firehouse to return key
1438 - 1500 Washing DEH truck
1502 - 1504 Cleaning out DEH truck
1506 Travel to sub-shop
1508 - 1510 Personal clean-up
1512 Idle - talking
1514 Travel to gasoline station

EXHIBIT II-A-7 (continued)

1516 Idle - waiting for another craftsperson
1516 - 1520 Travel to Askren Manors, Bldg. 511
1522 - 1530 Idle - waiting for another craftsperson
1532 - 1536 Travel to Ledward Barracks
1538 Idle - waiting for another craftsperson
1540 - 1546 Travel to another building at Ledward Barracks
1548 Idle - waiting for another craftsperson
1550 - 1552 Travel back to DEH
1554 Unloading tools and equipment
1556 - 1558 Paperwork

Conclusion

Craftsperson spent 34 minutes or 16% of craft time picking up other craftspersons at various job sites. Lack of sufficient vehicles for all craftspersons decreases the amount of craft time available for direct productivity.

Recommendation

Improved vehicular support will increase craft time available for direct productivity.

EXAMPLE B

FINDINGS OF FACT

SHOP: Electrical - One Worker

0730 - 0734 Travel to Building 305 on foot to repair light
0736 Awaiting occupant to let in
0738 Determined problem is switch
0740 - 0746 Return to shop on foot to get a switch
0748 - 0752 Repaired switch and two wall recepticals that were not on the Service Order
0754 Getting signature of occupant
0756 - 0758 Travel to Building 304
0800 - 0802 Fixing doorbell
0804 Travel to Building 301
0806 - 0810 Repairing two wall recepticals
0812 Getting signature of occupant
0814 Travel to shop for more work
0816 Receiving instruction from supervisor
0818 Travel to Building 3
0820 - 0822 Awaiting someone to show what the problem is
0824 Trying to determine what switch in breaker panel controls receptical to be fixed
0826 - 0832 Replacing receptical
0834 Cleanup job site
0836 - 0842 Fixing receptical and light on different Service Order number
0844 Travel to shop for switch and light bulb

EXHIBIT II-A-7 (continued)

0846 - 0848 Pickup light globe from supply
0850 Travel back to Building 3
0852 - 0854 Replaced light bulb - light worked (self help), replaced switch that was not needed
0856 - 0858 Getting signature
0900 Trying to locate responsible person for next Service Order, same building
0902 - 0904 No power was problem report - circuit breaker was off - self help
0906 Looking for broken receptical on second floor of Building 3, new service order
0908 - 0914 Repaired wall receptical
0915 Getting signature
0918 Travel to shop
0920 - 0926 Sorting service orders worked on and entering materials used
0928 - 0930 Travel to Building 2
0932 Determining problem
0934 Travel to shop
0936 - 0944 Break
0946 Travel to Building 2
0948 - 1014 Repairing two wall recepticals
1016 Cleanup job site
1018 Getting signature
1020 Travel to second floor
1022 Awaiting door to be unlocked
1024 Determined to have bad switch
1026 - 1028 Travel to shop for switch

EXHIBIT II-A-7 (continued)

1030	Getting switch from supply
1032	Paperwork
1034	Travel back to Building 2
1036 - 1038	Replacing switch
1040 - 1042	Travel to shop
1044	Paperwork
1046	Travel to Red Cross building
1048 - 1052	Work had already been completed, poor scheduling/records in shop
1054 - 1056	Travel to shop
1058	Awaiting CQ to identify work area
1100 - 1132	Replaced four receptacles (four were requested on Service order)
1134 - 1136	Idle
1138 - 1146	Replacing fifth wall socket not on service order
1148 - 1150	Awaiting CQ to open another room
1152 - 1154	Travel to shop
1156 - 1158	Idle, start lunch

Conclusion

22.2% of observed craft time was spent traveling. A more significant point is that of the 60 minutes travel (all on foot), 32 minutes was spent returning to the shop primarily to pick up more material. The material in this case, without exception, was all recepticals and switches, common use items that are shop stock and would be truck stock if the craftsperson was not on foot.

A review of the nine service orders indicated that 8 hours was charged to the service orders while working only 4.5 hours in the morning.

32 minutes of craft travel (9 trips) back to the shop for material in a 4.5 hour period is excessive and should be reduced.

EXHIBIT II-A-7 (continued)

By charging 8 hours to work accomplished in a 4.5 hour period, the craftsperson could not charge any time to the afternoon that amounted to 3.5 hours unaccounted for in the afternoon that consists of 3.5 hours work time.

Recommendation

Specific recommendation for these two findings of fact will be addressed in Sections 5 and 7 of this report. A means by which the craftsperson can transport common use items without returning to the shops, such as the use of small three wheel vehicles, will be addressed as a cost effective move.

Charging incorrect times to job orders can only be eliminated by educating the craftspersons as to what miss-charging does to their overall record of work and thus their competitive posture.

EXAMPLE C

FINDING OF FACT

SHOP: Plumbing - one worker

0730 - 0734 Gathering tools and equipment

0736 - 0742 Travel to job site. While worker utilized a bicycle for transportation, it was necessary to walk his bike due to the size and fragility of his equipment (commode)

0744 - 0816 Replacing a commode

0818 - 0824 Putting tools away and cleaning job site

0826 - 0828 Having service order signed

0830 Travel back to shop

0832 - 0834 Picking up second commode (no room the first time)

0836 - 0840 Travel to job site. Again, had to walk because of size and fragility of commode

0842 Unloading supplies

0844 - 0858 Replacing commode

0900 - 0908 Break

0910 - 0932 Clearing urinals

0934 - 0942 Putting away tools and cleaning up job site

0944 Having service order signed

0946 - 0948 Travel back to shop for additional equipment

0950 Loading equipment onto bike

0952 - 0954 Travel to next job site

0958 - 1052 Clearing floor drain and urinals

1054 - 1056 Cleaning job site

1058 - 1130 Clearing urinals (not on service order)

EXHIBIT II-A-7 (continued)

1132 - 1134 Cleaning tools and job site
1136 - 1142 Completing work
1144 Putting tools away
1146 - 1148 Travel to shop
1150 Unload equipment
1152 - 1154 Performing work at shop for another job
1156 - 1158 Clean up and lunch
1200 - 1228 Lunch
1230 Gathering tools and equipment
1232 - 1234 Travel to job site
1236 Unload tools and equipment
1238 - 1300 Repairing commode pipe
1302 - 1306 Job site clean up
1308 - 1330 Repairing urinal (not on service order)
1332 - 1334 Job site clean up
1336 - 1340 Completing job
1342 Putting tools and equipment away
1344 - 1346 Having service order signed
1348 - 1350 Travel to next job
1352 - 1432 Clearing urinals
1434 - 1442 Cleaning up job site
1444 Having service order signed
1446 - 1448 Travel to next job
1450 - 1458 Break
1500 - 1530 Clearing floor drain

EXHIBIT II-A-7 (continued)

1532 - 1542 Cleaning up job site and putting tools away
1544 - 1546 Travel back to the shop
1548 Putting tools away
1550 - 1553 Tool maintenance (wiping off and oiling)

Conclusion

From the finding of fact presented above, the following conclusions may be made:

- o Vehicles have insufficient carrying capacities. As demonstrated in the example, extra travel was required by this worker due to small carrying capacity of his bicycle. The extra travel manifested itself in three ways:
 - (a) The bicycle had to be pushed when carrying a commode for fear that the commode would fall from the small carrying basket.
 - (b) The vehicle would only accommodate one commode at a time. A two-commode job (as illustrated) requires added travel.
 - (c) When carrying large loads (such as commodes), other tools and equipment (drain snakes) may not be accommodated without requiring extra trips.

This extra travel, combined, results in a large, avoidable amount of nonproductive time.

- o Work often performed by worker was not included on the service order. As demonstrated, the worker would respond to a service order requested for a stopped urinal. The worker would then clear the urinal in question, check all other urinals, commodes, and other plumbing, and perform all other necessary repairs. This additional work was not included on the service order by the worker, understating the workload of the shop.

Recommendation

In light of the conclusions drawn above, several recommendations have been made. Vehicles with larger storage capacities should be provided worker for work located at Conn Barracks. Large tricycles or other similar 3-wheel vehicles may be used. Such vehicles would allow the workers to carry more tools and equipment, thus saving extra trips back to their shop. Additionally, these vehicles would be large enough so that the pushing of a heavily loaded bicycle could be eliminated. The prime consideration in such vehicles is the amount of carrying/storage

EXHIBIT II-A-7 (continued)

capacity provided. The subject of vehicles will be addressed separately in Section V.

To ensure that all work performed by the worker is included on the completed service order, it is recommended that all craftspeople be briefed (one-half hour seminars) as to the importance of including completed work on the service order. Reference to the new IFS system should be made. Also, it should be explained that this additional information is crucial to the competitive posture of the DEH workforce.

EXHIBIT II-A-7 (continued)

EXAMPLE D

FINDING OF FACT

SHOP: Plumbing - one worker

0730 - 0732 Craftsperson organizing tools at work shop (511 Askren Manor)

0734 - 0736 Craftsperson crosses street to 500 Askren Manor to pick up bike

0738 - 0740 Organizing tools for job assignment

0742 Awaits co-worker

0744 - 0830 Working with co-worker on Service Order in Building 511

0832 Awaits co-worker who has gone to pick up tools

0834 - 0844 Cuts and threads pipe at shop

0846 Walks back down hall to job site

0848 - 0906 Working with co-worker on same Service Order

0908 - 0910 Putting up equipment at end of hall

0912 Personal clean-up

0914 - 0924 Break

0926 Pick up key necessary for next job at Building 500

0928 - 0930 Organizing equipment for next job

0932 - 0934 Walk to Building 513

0936 - 1012 Work with co-worker on pipes until co-worker was not needed, whereupon he left

1014 Travel back to Building 511 to cut and thead pipe

1016 - 1022 Cutting and threading pipe

1024 Travel back to work sight at Building 513

1026 - 1110 Working on pipes in 513

EXHIBIT II-A-7 (continued)

1112 Travel back to shop to cut and thread pipe
1114 - 1120 Cutting and threading pipe
1122 Confers with foreman
1124 - 1126 Travel back to work sight with pipe
1128 - 1156 Working on pipes in 513
1158 Carries tools for storage in hallway at end of 513
1200 - 1230 LUNCH
1232 Paperwork
1234 Travel by bike to job site
1236 Carrying tools to job site
1238 - 1244 Fixing toilet
1246 Putting up tools
1248 - 1250 Biking to next job site
1252 - 1256 Fixing sink
1258 Biking to next job site, Building 513
1300 Laying out tools at job site
1302 - 1306 Working on pipes
1308 Must pick up key to laundry room from family upstairs
1310 - 1332 Fixing pipes
1334 Must pick up key upstairs to private storeroom
1336 - 1350 Working on pipes
1352 Putting up tools
1354 - 1356 Working on pipes
1358 - 1400 Travel back to shop
1402 Puts up tools in shop

EXHIBIT II-A-7 (continued)

1404 - 1406 Pick up sink from storage
1408 - 1414 Walk bike with sink in carriage from shop to work sight,
Building 413
1416 Laying out tools at work site
1418 - 1504 Putting in sink
1506 Putting up tools
1508 - 1514 Walks bike to next work site
1516 - 1522 Working
1524 Getting service order signed
1526 - 1530 Walks back to shop with bike
1532 Looking over service orders
1534 - 1536 Travel to 515 with new service order
1538 - 1540 Removing toilet bowl for shop work
1542 - 1544 Travel back to shop with toilet bowl
1546 Conferring with foreman by phone
1548 Returns bike to Building 500
1550 - 1554 Paperwork
1556 - 1558 Cleanup and dressing

Conclusions

There are four primary findings that can be drawn from the above information.

- o Fifty-four minutes of craft time was spent traveling, twenty-two of which he spent walking his bike with fragile equipment in the bike's basket
- o Ten minutes of craft time in the morning was spent just on traveling to and from the work shop, twice to cut and thread a pipe
- o Sixty minutes of craft time was spent picking up and returning a bike from Building 500

EXHIBIT II-A-7 (continued)

- o Ten minutes of craft time in the afternoon was expended returning to the shop for equipment or supplies

Recommendations

Travel time may be substantially reduced by the use of a motorized or gasoline powered vehicle rather than a bike. Travel time may also be reduced if this vehicle were equipped with a storage cabinet large enough to allow the craftsman to transport tools and supplies. See recommendation on vehicle utilization Section V.

AD-A149 392

PRODUCTIVITY REVIEW AND ANALYSIS OF DIRECTORATE OF
ENGINEERING AND HOUSING AT SCHWEINFURT MILITARY
COMMUNITY(U) HAMM (E L) AND ASSOCIATES INC VIRGINIA

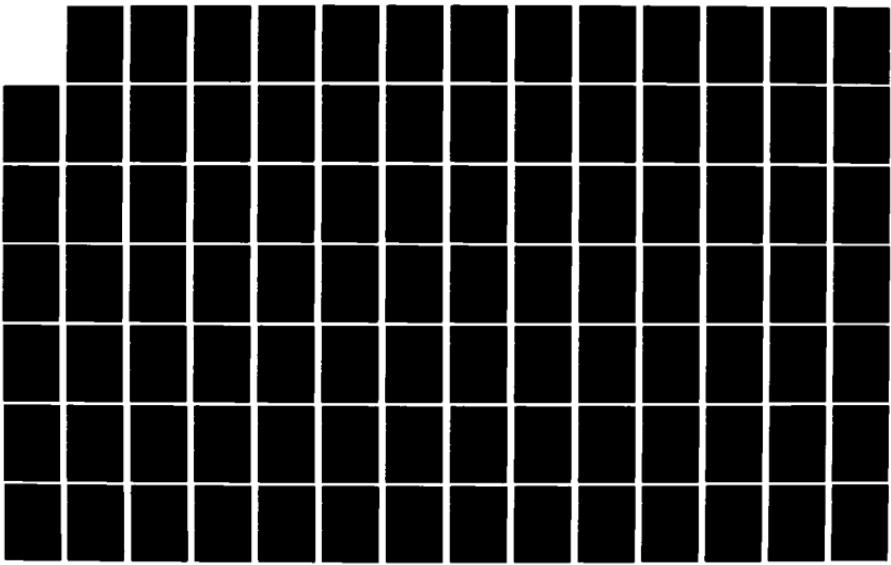
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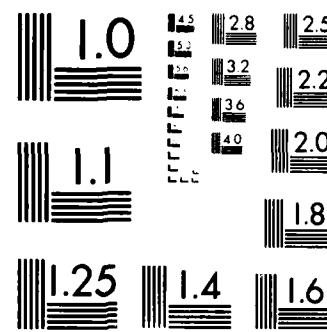
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EXAMPLE E

FINDINGS OF FACT

SHOP: Electric - one worker

0730 - 0732 Awaiting assignment
0734 - 0736 Idle - waiting on other craftspersons
0738 - 0750 Travel to job site, traveling with other craftspersons
0752 Handling materials is sub-shop
0754 Pumping air into bicycle tire
0756 - 0758 Worker planning his own service order sequence
0800 - 0804 Replacing antenna cable in Bldg. 516, Askriin Manor
0806 Waiting for someone to answer apartment door - C1
0808 - 0818 Replacing interior apartment cable
0820 Waiting for someone to answer apartment door - C3, no one home, cannot continue repairs
0822 Gathering tools and equipment
0824 - 0826 Travel to 13 Jackson St.
0828 Waiting for someone to answer door, no one home, traveled to 16 Jackson
0830 - 0852 Repairing doorbell
0854 - 0856 Getting material and tools from tool box
0858 - 0908 Replacing doorbell unit
0910 Paperwork
0912 - 0914 Adjusting loudness of bell
0916 - 0918 Travel back to Bldg. 415
0920 - 0924 Replacing antenna cable
0926 Getting equipment from bicycle

EXHIBIT II-A-7 (continued)

0928 - 0934 Replacing antenna cable
0936 Getting material from bicycle
0938 - 1014 Replacing interior antenna cable
1016 Paperwork
1018 Travel back to sub-shop
1020 Personal break
1022 Handling tools in shop
1024 - 1026 Travel to commissary
1028 - 1122 Completing IJO previously started
1124 - 1126 Travel to sub-shop
1128 Personal clean-up
1130 Travel to Bldg. 511, Apt. C-8
1132 - 1138 Replacing kitchen socket
1140 Travel to Bldg. 513, Apt. C-2
1142 No one home
1144 - 1146 Working on dryer socket
1148 Travel back to commissary
1150 - 1158 Working on IJO again
1200 - 1228 Scheduled lunch break
1230 Idle
1232 Travel back to commissary
1234 - 1258 Working IJO
1300 Receiving instructions from foreman
1302 - 1310 Completing work on IJO
1312 Gathering tools and equipment

EXHIBIT II-A-7 (continued)

1314 - 1316 Cleaning up job site
1318 - 1320 Travel back to sub-shop
1322 Putting away equipment
1324 - 1326 Travel to Bldg. 532
1328 - 1358 Repairing washer socket and plug
1400 Putting away tools and equipment
1402 Paperwork
1404 - 1406 Travel back to commissary
1408 - 1538 Replacing light bulbs in exit signs throughout the facility
1540 Paperwork
1542 Examining electric door opener's operation
1544 Putting away tools and equipment at job site
1546 Putting away tools and equipment in the sub-shop
1548 - 1558 Travel with other craftspersons back to DEH

Conclusion

Approximately 26 minutes of craft time was spent traveling from the DEH to the job site. Lack of sufficient vehicles for craftspersons led to indirect travel time rather than the availability of craft time for direct productivity. 90 minutes or 20% of craft time was spent on self-help light bulb replacement.

Recommendation

Supplying the craftspersons with adequate transportation that eliminates wasteful travel time will lead to higher productivity. Additionally, better service order screening in order to eliminate self-help items such as light bulb replacement will provide more time for handling more complicated craft tasks and reduce shop backlogs.

EXHIBIT II-A-7 (continued)

EXAMPLE F

FINDINGS OF FACT

SHOP: Electric - one worker

0730 - 0736 Awaiting assignment at DEH
0738 - 0756 Travel time spent dropping off one craftsperson at Ledward and another at Askren Manor, then driving to Conn Shop, Building 73, to pick up material
0758 - 0800 Picking up equipment at Conn Shop - Building 73
0802 - 0806 Driving back to DEH
0808 - 0810 Awaiting assignment
0812 - 0830 Driving to isolated installation ten miles from DEH
0832 - 0834 Signing in to get in Building 702
0836 - 0912 Maintenance work on generators at Building 702
0914 - 0930 Driving to installation HHB-37FDC
0932 - 0934 Waiting to sign in to enter HHB-37FDC
0936 Carries tools from truck to work site
0938 - 1022 Maintenance work on power converter
1024 - 1026 Cleaning up
1028 Carrying materials to truck
1030 - 1032 Traveling to Ledward
1034 No work available at Ledward
1036 - 1038 Traveling from Ledward to DEH shop
1040 Receiving instructions from foreman
1042 Restroom break
1044 - 1050 Traveling to Conn
1052 Picking up instructions at Conn Building 19

EXHIBIT II-A-7 (continued)

1054 - 1100 Traveling to Conn Bldg. 92 for Service Order
1102 - 1124 Working on boiler
1126 Moving equipment
1128 Restroom break
1130 Carrying tools to truck
1132 Driving to Conn Building 74 to deliver fire extinguisher
1134 Carrying in fire extinguisher
1136 Awaiting another extinguisher
1138 Walking back to truck with new extinguisher
1140 - 1142 Working in shop
1144 Driving to Conn Building 19
1146 - 1148 Conferring with personnel about broken equipment
1150 Driving back to Conn Building 73 for break
1152 - 1228 Extended lunch break
1230 - 1232 Awaiting assignment
1234 Traveling to Conn Building 58
1236 Trying to determine what is wrong with crane
1238 - 1242 Working on crane
1244 Carrying tools to truck
1246 Traveling to Conn Building 42
1248 Checking high voltage machines and batteries
1250 Carrying tools from truck to work site
1252 - 1306 Putting water in batteries at Conn Building 42
1308 - 1310 Traveling to Conn Building 58
1312 Checking out another crane

EXHIBIT II-A-7 (continued)

1314 - 1318 Traveling to Conn Building 73, the workshop
1320 - 1322 Travel to Conn Building 23
1324 Sweeping Conn Building 23
1326 - 1328 Checking out batteries to high voltage equipment in Conn Building 23
1330 - 1340 Filling batteries with water
1342 Inspecting other equipment in same building
1344 Sweeping building
1345 Return to Conn Building 73
1348 - 1350 Traveling by truck to Conn Building 16
1352 Checking out filters
1354 - 1356 Cleaning filters
1358 - 1408 Changing water in batteries
1410 Checking machines
1412 - 1420 Sweeping Conn Building 16's rooms
1422 - 1424 Travels to Conn Building 31
1426 Inspecting equipment
1428 Picking up materials from truck
1430 - 1436 Filling batteries with water
1438 Picking up materials from truck
1440 Closing up Conn Building 31
1442 Putting up equipment
1444 - 1446 Traveling back to workshop (Conn Building 73)
1448 - 1458 Break
1500 - 1502 Receiving instructions from supervisor
1504 - 1506 Traveling to Building 74

EXHIBIT II-A-7 (continued)

1508 - 1522 Cleaning equipment
1524 Traveling back to work shop, Conn Building 73
1526 Personal clean up
1528 Idle time
1530 - 1536 Traveling to pick up coworker in Askren Manor
1538 - 1548 Awaiting coworker at Askren Manor Building 511
1550 - 1558 Traveling back to work shop

Conclusions

There are two primary findings that can be drawn from the above information:

- o The craftsperson made nine shop trips, whether to the Conn Shop or DEH shop, throughout the day. Just returning to the shops took a total of twenty-eight minutes, excluding the return to DEH at work day's end.
- o The craftsperson, left with no work at the end of the day, spent twelve minutes waiting for a coworker in Askren Manors

Recommendations

Were the craftsperson to take his breaks at the work site in lieu of returning to the shop, he could, in this case, have saved over six minutes of travel time. Travel time may also be somewhat reduced were the craftsman to have a hand-held two-way radio system, with which to communicate with his foreman. If the craftsperson were also to carry all supplies for the entire day, the number of repetitive trips would be reduced.

EXHIBIT II-A-7 (continued)

EXAMPLE G

FINDINGS OF FACT

SHOP: Metal - 2 craftspeople

0730 - 0742 Getting tools and loading equipment into vehicle
0744 - 0756 Travel to job site A - gym (at Conn Barracks)
0758 Identifying location of problem with customer
0800 - 0848 Replacing metal slats in bathroom ceiling
0854 - 0858 One worker has Service Order signed, other worker is idle
0900 - 0910 Break
0912 Travel to job site B-barracks
0914 - 0918 Discussing job with customer
0920 - 0922 Idle, while waiting for a key to room
0924 - 0928 Drawing appropriate equipment from truck
0930 - 0942 Preparing door for lock
0944 - 0946 Returning equipment to truck
0948 - 1000 One worker travel back to supply while other worker goes to a job site C-barracks
1002 - 1006 Obtaining lock from supply
1008 - 1016 Travel to job site C
1018 - 1020 Locate other worker
1022 Travel back to job site B
1024 - 1046 Install lock on door
1048 Return equipment to truck
1050 Having SO signed
1052 Travel to job site D - barracks

EXHIBIT II-A-7 (continued)

1054 - 1058 Asking directions to job site D
1100 - 1104 Travel to job site D
1106 - 1108 Requestor not located
1110 Travel to job site E - barracks
1112 - 1114 Identify problem is not for metal shop
1116 Travel to job site F - commissary warehouse
1118 - 1120 Locate customer and look at door
1122 - 1126 Travel to job site G - warehouse
1128 - 1148 Repair warehouse door
1150 Returning equipment and tools to truck
1152 - 1158 Return to shop for lunch
1200 - 1228 Lunch
1230 - 1234 Restroom
1236 - 1244 Travel to job site
1246 - 1254 Gaining access to secured area, finding nothing wrong
1256 Travel back to job site D
1258 - 1302 Discussing job with requestor (to put padlock on door)
1304 Travel back to job site F
1306 - 1308 Discussing job with customer
1310 - 1320 Repairing door at commissary
1322 - 1328 Locating someone to sign Service Order
1330 Travel to job site H - dining hall
1332 - 1336 Discuss job with customer
1338 - 1346 Both workers travel back to shop
1348 - 1402 One worker does paperwork in truck while waiting for the other worker to obtain padlocks from supply

EXHIBIT II-A-7 (continued)

1404 - 1414 Travel back to job site F
1415 Give padlock to customer
1418 Travel back to job site D
1420 - 1436 Unload equipment and install padlock
1438 Have service order signed
1440 Travel to job site H
1442 - 1506 Planning (identifying and measuring all areas for replacing metal stripping)
1508 - 1510 Idle (break)
1512 - 1522 Travel back to shop
1524 - 1546 Unloading tools/equipment and completing paperwork
1458 - 1558 One worker cleaning up and dressing, other worker idle

Conclusion

The example serves to indicate the lack of sufficient information on service orders. Several times the workers were required to visit the work site so that an accurate assessment of the work could be made. Both instances necessitated separate return trips to obtain needed supplies - a padlock and key lock. Each trip required approximately 20 extra minutes of travel time, for a total of 40 minutes in one day. Inclusion of more detailed information on service orders could eliminate such travel.

Recommendation

In order to reduce indirect productive time associated with travel resulting from lack of sufficient service order data, it is recommended that work reception become more familiar with information needed by workers to accomplish the job. When service orders are called in to work reception, additional information, as needed, may be solicited from the customer. Then if service orders are delivered to the shop without enough information, additional calls, or a visit, may be made by the shop foreman. The result would be to increase productive time available to the worker, enabling him to perform more work.

EXHIBIT II-A-7 (continued)

EXAMPLE H

FINDINGS OF FACT

SHOP: PM Team

0730 Awaiting assignment
0732 - 0736 Travel to pick up vehicle
0738 - 0752 Checking sockets and switches in barracks facility
0754 Moving tools to another part of facility
0756 - 0800 Replacing rubber seal around door frame
0802 Waiting for first sergeant with keys
0804 - 0806 Checking switches and sockets
0808 Moving tools and equipment
0810 - 0822 PM bathroom facilities
0824 Idle - talking
0826 - 0832 Checking sockets and switches
0834 Paperwork
0836 - 0838 Checking sockets and switches
0840 Paperwork
0842 - 0844 Awaiting first sergeant with keys
0846 - 0854 Trying to find someone with keys - first sergeant didn't show
0856 - 0914 Checking sockets, switches, and door knobs
0916 - 0918 Looking for someone with keys to the next floor
0920 Paperwork
0922 - 0924 Travel to another barracks facility
0926 Unloading tools and equipment

EXHIBIT II-A-7 (continued)

0928 Idle - talking
0930 Looking for an unlocked door
0932 - 0940 Checking lights, switches, and sockets
0942 Walking outside to truck
0944 - 0952 Taking break
0954 - 0956 Travel back to barracks
0958 - 1006 Checking light bulbs
1008 Travel to another part of barracks facility
1010 - 1014 Replacing exterior light bulbs
1016 Cleaning up empty boxes
1018 - 1022 Replacing light bulbs
1024 Travel to another part of facility
1026 Cleaning up debris
1028 - 1030 Travel to another part of facility
1032 - 1046 Replacing light bulbs
1048 Travel to another barracks
1050 - 1052 Waiting for someone with keys
1054 - 1120 Checking switches and sockets
1122 Waiting for someone with keys
1124 - 1130 Checking switches and sockets
1132 Moving tools and equipment
1134 - 1152 Checking switches and sockets
1154 - 1158 Travel back to shop for lunch

Conclusion

38 minutes or 14% of craft time was spent replacing light bulbs in exterior fixtures. Preventive maintenance tasks on all electric

EXHIBIT II-A-7 (continued)

switches, sockets, or fixtures was done while circuit breakers were on. Several times, actions of craftspersons resulted in either tripping circuit breakers or shocks to the worker.

Recommendation

All self-help tasks being performed should be eliminated from preventive maintenance activities. Safety precautions should be strictly adhered to, in order to prevent injuries to the work force.

EXHIBIT II-A-7 (continued)

EXAMPLE I

FINDINGS OF FACT

SHOP: Kitchen and Refrigeration - one worker

0730 - 0732 Craftsperson doing paperwork

0734 Craftsperson picks up service orders

0736 Craftsperson picks up key to truck and truck

0738 - 0744 Doing paperwork in shop

0746 - 0750 Loading truck with tools and equipment

0752 - 0800 Traveling from DEH shop to Conn Building 90

0802 - 0804 Delivered refrigerator with co-worker

0806 - 0808 Traveling to Conn Building 30

0810 - 0814 Planning job, determining what parts are needed to fix refrigerator handle - 2 persons on 1 person job

0816 - 0818 Waiting for co-worker to determine which parts are needed for broken dishwasher at other end of Conn Building 30

0820 Inspecting broken dishwasher

0822 - 0832 Traveling back to DEH shop to pick up parts for jobs at Conn Building 30

0834 Paperwork, determining price and type of part needed

0836 - 0846 Travels back to Conn Building 30 with new parts

0848 - 0852 Fixing refrigerator handle

0854 Walking to truck to pick up equipment

0856 - 0858 Walking to dishwasher with new part - two persons on a one person job

0900 - 0912 Taking break at Conn Building 30

0914 - 0922 Traveling to Ledward Building 213

0924 Doing paperwork

EXHIBIT II-A-7 (continued)

0926 - 0928 Idle while partner inspects equipment - two persons on a one person job

0930 Traveling with coworker to Ledward Building 214

0932 Idle while partner checks out equipment

0934 Picking up equipment from truck

0935 - 0938 Inspecting broken drink machine

0940 - 0944 Working on coffee machine in same building

0946 Picking up equipment from truck

0948 - 1000 Working on coffee machine

1002 Carrying tools to next machine

1004 Working on another drink machine

1006 Picking up equipment from truck

1008 - 1010 Working

1012 Checking out fixed machine

1014 Carrying tools to truck

1016 Traveling to DEH with coworker

1018 Restroom break

1020 Walking to engineer's office

1022 - 1028 Waiting for personnel

1030 Doing paperwork

1032 - 1036 Traveling to Ledward Building 213 with coworker

1038 - 1040 Waiting in truck while partner runs into 213

1042 Handling tools

1044 Traveling to Ledward Building 214 to get previously completed service order signed

1046 Idle, awaiting coworker

EXHIBIT II-A-7 (continued)

1048 Traveling to Ledward Building 212
1050 - 1052 Carrying equipment to 212
1054 - 1114 Maintenance order work
1116 Transporting equipment, same building
1118 Idle while partner works, 2 persons on 1 person job
1120 - 1124 Continues maintenance work at another kitchen
1126 - 1130 Checking for machines needing maintenance work upstairs
1132 Leaving building with equipment
1134 - 1138 Traveling back to DEH shop
1140 - 1158 Doing paperwork

DIFFERENT WORKER SAMPLED IN AFTERNOON

1230 Extended lunch break
1232 - 1242 Shop work
1244 Carrying tools to truck
1246 - 1258 Traveling to Conn Building 134 with coworker
1300 Awaiting signal to enter isolated installation
1302 Driving from gate to work site
1304 Carrying equipment into work site
1306 Service work on oven
1308 To truck to get materials
1310 - 1312 Working on oven
1314 To truck to get materials
1316- 1318 Working, two persons on a one person job
1320 Idle
1322 - 1325 Fixing oven while coworker watches

EXHIBIT II-A-7 (continued)

1328 Inspecting fixed oven
1330 Picking up equipment from truck
1332 Leaving job site
1334 Awaiting signing of service order
1336 - 1348 Traveling to Ledward Building 212 for maintenance work
1350 Carrying equipment in
1352 Traveling to Ledward Building 213 for maintenance work as partner goes back to shop
1354 Carrying equipment into Ledward Building 213
1356 - 1358 Maintenance work
1400 Transporting equipment in building
1402 Inspecting sink for problems
1404 - 1426 Maintenance work on faucets
1428 Finishing at site and walking upstairs
1430 Inspecting faucet for problems
1432 - 1436 Working on faucet
1438 Partner comes back, 2 persons on one person job
1440 Leaving Ledward Building 213
1442 Traveling to Ledward Building 214
1444 Inspecting faucet for defects
1446 Working on faucet
1448 - 1458 Break time
1500 - 1510 Works on faucets
1512 - 1514 Transporting equipment
1516 Inspecting faucet
1518 Working on refrigerator

EXHIBIT II-A-7 (continued)

1520	Waiting while partner finishes working
1522	Helping partner
1524	Carrying tools to truck
1526 - 1528	Traveling back to shop
1530 - 1532	Carrying tools into shop
1534 - 1558	Fixing dishwasher drain at shop

Conclusions

There are three points to be made from this work sampling.

- o In the morning alone, worker spent forty-two minutes on paperwork. He also spent 110 minutes driving the truck that morning.
- o There was at least twenty minutes of time wasted because two persons were on several one person jobs.
- o The workers made two shop trips during the day. One of these trips was to pick up equipment, another to eat lunch. Total time expended just on returning to the shop was eighteen minutes.

Recommendations

Were the non-driver to do paperwork in the truck, several manhours may be gained each week. Also, shop trips could be condensed to one were the workers to go to all service orders, determine which parts are needed, then make one shop trip to pick up these parts. Better planning would have kept the workers from making three separate trips to Conn. Two trips were for service orders and one was to pick up parts for the first service order. The workers should have gone to both service orders first, determined necessary parts, and then made one shop trip and one return trip to Conn. Proper identification of the work from Work Reception and adequate truck stock would reduce travel also.

Also, splitting up the workers to one-person jobs should reduce wasted time. If possible, the workers could do one person jobs one day and two person jobs the next.

EXHIBIT II-A-7 (continued)

EXAMPLE J

FINDINGS OF FACT

SHOP: Electric (Conn Barracks) - one worker

0730 Gathers tools at shop
0732 - 0734 Walks to job site
0736 Locating customer
0738 - 0800 Works on replacing outlets (sent other worker from DEH back to shop at Conn to get additional equipment)
0802 - 0806 Searching small tool box for screw
0808 - 0900 Replacing more outlets and switches
0902 Has service order signed
0904 - 0914 Travel back to shop at Conn Barracks to obtain fluorescent fixtures and bulbs for the next job
0916 Discusses job with customer
0918 - 1016 Replaces fluorescent fixtures and bulbs and checks other outlets
1018 Has service order signed
1020 Travel to next job
1022 - 1024 Locating customer
1026 - 1058 Replaces outlets
1100 Travel to next job
1102 - 1134 Replace switches and outlets
1136 Has service order signed
1138 Travel to next job
1140 Discusses job with customer
1142 - 1150 Replaces fluorescent bulbs

EXHIBIT II-A-7 (continued)

1152 Has paperwork signed
1154 - 1158 Travel back to the shop
1200 - 1228 Lunch
1230 Gather needed supplies and tools
1232 - 1236 Travel to job site
1238 - 1242 Waiting for keys to room
1244 - 1254 Checking and replacing outlet
1256 - 1306 Trying to locate next room
1308 Travel to another job
1310 - 1316 Replace outlets
1318 Travel to next job
1320 - 1332 Waiting for keys to room
1334 Check socket
1336 Discuss job with customer
1338 - 1344 Return to shop for correct socket
1346 - 1348 Replace socket
1350 - 1352 Load tools and have service order signed
1354 - 1356 Travel to next job
1358 Discuss job with customer
1400 - 1402 Replace socket
1404 - 1412 Travel to job site
1414 - 1424 Check and replace outlet
1426 Have service order signed
1428 Travel to job site
1430 - 1436 Replace switch

EXHIBIT II-A-7 (continued)

1438	Have service order signed
1440 - 1502	Replacing fluorescent tubes in exit signs
1504	Idle
1506	Have service order signed
1508 - 1520	Travel to next job
1522 - 1534	Locate customer and keys, only to find nothing wrong (bad service order)
1536	Travel
1538	Discussing job with customer
1540	Waiting on customer
1542	Travel
1544	Waiting on customer
1546	Has service order signed
1548 - 1550	Travel back to shop
1552	Put tools and supplies away
1554 - 1556	Obtaining material from shop stores
1558	Housekeeping

Conclusion

The above example serves to illustrate:

- o Lack of appropriate vehicle. The worker in this illustration had to travel back to his shop numerous times to obtain needed material that he was unable to carry all at once. This reduces available productive time.
- o Lack of proper planning. In this example, much time was lost due to the inability of the worker to gain access to the job site. Even after return trips, the worker often found that the requestor or individual customer was not available.
- o Self-help work is being requested through service orders. In two distinct cases, this worker was required to replace fluorescent tubes in response to "faulty lighting" service orders. It appears that such work is clearly self help.

Recommendation

To increase productive time available to the worker in light of the above conclusion, it is recommended that vehicles with locked storage capacity be provided to the workers located at Conn Barracks. Vehicles, for this purpose, need only consist of large tricycles or other similar 3-wheel vehicles. The most important attribute of such a vehicle should be the availability of locked storage so that sufficient materials, supplies, and tools may be carried with the worker on service order calls. This subject of vehicles for Conn Barracks will be addressed separately in Section V.

Additionally, it is recommended that customers be notified of a workers intent to visit, prior to the workers arrival. Then, if customers are not available, the worker may not waste unnecessary trips. Equally important the worker may be notified as to when the customer will be available. The worker may then plan his service orders accordingly.

Lastly, better education for the troops is needed to identify work that may be performed through the self-help program. This again will be addressed separately in Section V.

EXHIBIT II-A-7 (continued)

EXAMPLE K

FINDINGS OF FACT

SHOP: Masonry - two workers

0730 - 0732 Idle
0734 - 0742 Travel to motor pool to pick up utility vehicle
0744 Loading pneumatic hammer on vehicle
0746 Travel by truck to job site
0748 - 0752 Unloading tools and material from truck
0754 - 0804 Two craftspersons operating pneumatic hammer
0806 Both craftspersons taking a short break - idle
0808 - 0812 Operating hammer
0814 Taking another break - idle
0816 - 0832 Operating hammer
0834 - 0840 One craftsperson returning to shop for ear protection, co-worker continues with productive work
0842 - 0852 Operating hammer
0854 Planning on the job site
0856 - 0906 Operating hammer
0908 Taking a break - idle
0910 - 0922 Operating hammer
0924 - 0928 Planning on the job site
0930 - 0944 Taking an official break
0946 - 0956 Operating hammer
0958 - 1020 One craftsperson using hand chisel, other craftsperson cleaning job site
1022 One craftsperson idle, other continues to clean

EXHIBIT II-A-7 (continued)

1024 - 1032 One craftsperson using hand chisel, co-worker continues to clean job site

1034 Planning on the job site

1036 - 1052 One craftsperson using hand chisel, co-worker returns to shop for broom

1054 Both workers loading pneumatic hammer on truck

1056 - 1058 One worker chiseling, one cleaning

1100 Idle - talking

1102 - 1110 One worker chiseling, one worker cleaning job site

1112 - 1124 One worker leaves and walks to a toilet facility, one worker chisels

1126 - 1128 Planning on the job site

1130 - 1140 Both craftspersons putting away tools and equipment

1142 - 1144 One worker cleaning, other taking a bathroom break

1146 Putting away tools and equipment

1148 - 1150 Idle - talking

1152 - 1156 Travel back to shop for lunch

1158 Idle before scheduled lunch break

Conclusion

Approximately 20% of craft time was expended cleaning the job site or laying out and putting away tools and equipment. 6% or 32 minutes of the available 540 craft minutes was spent planning on the job site. 40 minutes or 7% of craft time was wasted due to worker idleness in taking unauthorized breaks or talking.

Recommendation

Better supervision and direction by shop foremen would preclude excessive job site planning and excessive job site cleaning. Shop floor supervision should also prevent wasted craft time due to idleness. Anticipation of job safety requirements would have prevented a needless shop return.

EXHIBIT II-A-7 (continued)

EXAMPLE L

FINDINGS OF FACT

SHOP: Kitchen and Refrigeration - one worker

0730 - 0732 Repairing drain at shop
0734 Carrying tools to truck
0736 Repairing pipe
0738 - 0740 Carrying tools to truck
0742 - 0750 Picking up material at shop supply store
0754 - 0802 Traveling in truck to Conn Building 14
0804 Unloading tools and equipment
0806 Inspecting water fountain
0808 - 0820 Two persons on one person job
0822 Carrying equipment upstairs to work on different fountain
0824 - 0840 Repairing water fountain
0842 - 0846 Travel to Conn Bldg. 73 to pick up required equipment; equipment is not there
0848 - 0854 Traveling back to DEH
0856 - 0858 Picking up materials at shop
0900 - 0912 Break time
0914 - 0922 Working at shop
0924 - 0926 Carrying equipment to truck
0928 Working while awaiting co-worker with new service order
0930 Housekeeping
0932 - 0934 Awaiting co-worker
0936 - 0940 Picking up materials at shop supply store

EXHIBIT II-A-7 (continued)

0942 - 0948 Traveling by truck to Conn
0950 Carrying equipment into Conn Building 14 to work on water fountains with new materials
0952 - 0956 Working on water fountains
0958 Transporting materials
1000 - 1013 Working while co-worker watches -- two persons on one person job
1020 Planning on job site
1022 - 1024 Repairing water fountain
1026 - 1028 Carrying equipment upstairs to other fountain
1030 - 1045 Working on upstairs water fountain
1043 Going back downstairs
1050 - 1054 Working on downstairs water fountain
1056 Checking fountain to see if fixed
1058 - 1103 Working back upstairs now, 2 persons on one person job
1110 Cleaning up job site
1112 Planning on job site
1114 Finishing up service order
1116 - 1118 Cleaning up
1120 - 1122 Traveling by truck to Conn Building 30
1124 - 1132 Doing service work on cooling equipment
1134 - 1136 Cleaning up; both workers were instructed they couldn't work because food was being cooked nearby
1138 Looking over work at other end of same building
1140 Carrying tools to truck
1142 - 1154 Traveling back to DEH shop
1156 - 1158 Carrying equipment into shop from truck

EXHIBIT II-A-7 (continued)

DIFFERENT CRAFTSPERSON

1230 Housekeeping
1232 - 1234 Walking to pick up service orders
1236 - 1246 Traveling back to Conn Building 30
1248 - 1250 Carrying tools into building
1252 - 1258 Working with co-worker on kitchen equipment
1300 - 1302 Transporting materials for maintenance work at other end of building
1304 - 1320 Finishing work on kitchen equipment
1322 Putting away equipment in truck
1324 Taking a break
1326 Putting away equipment in truck
1328 Traveling to Conn Building 6
1330 Maintenance work in Building 6
1332 Unloading equipment from truck
1334 - 1340 Maintenance work
1342 Unloading equipment from truck
1344 Maintenance work
1346 Unloading equipment from truck
1348 - 1408 Preventive maintenance, looking for problems
1410 - 1412 Looking for paper towels
1414 - 1426 Fixing ice dispenser
1428 - 1430 Getting light bulbs from truck
1432 - 1442 Traveling back to DEH shop
1444 Unloading equipment
1446 - 1448 Paperwork

EXHIBIT II-A-7 (continued)

1450 - 1500 Break
1502 - 1540 Paperwork, ordering parts
1542 Receiving instructions from supervisor
1544 Returning truck to vehicle compound and returning key
1546 - 1558 Paperwork, ordering parts

Conclusions

Each of the two workers spent a total of thirty-two minutes of travel time and equipment transportation by returning to the DEH Shop for lunch. Both of the workers also spent twenty minutes each, returning to the shop for materials earlier in the morning.

Recommendations

If the shop trips were condensed to one, twenty to thirty minutes of travel time per worker per shop trip could be saved. Also, better craft scheduling may prevent time lost due to two persons on a one person job.

EXHIBIT II-A-7 (continued)

EXAMPLE M

FINDING OF FACT

SHOP: Preventive Maintenance (PM) - 3 craftspersons

0730 Checking truck for all equipment and supplies
0732 - 0742 Travel to Askren Manor for PM
0746 Unloading supplies from truck
0748 - 0802 Performing PM in apartment (lightbulbs and faucets)
0804 One worker has maintenance form signed while two are idle
0806 - 0822 Obtaining needed equipment and performing PM in apartment
 (shower head, outlets)
0824 - 0826 One worker has maintenance form signed while two are idle
0828 - 0838 Performing PM in apartment (door stoppers, drain plugs,
 light bulbs)
0840 - 0842 One worker has maintenance form signed while two are idle
0844 - 0900 Performing PM in apartment
0902 - 0914 Break
0916 - 0928 Performing PM in apartment
0930 One worker has maintenance form signed while two are idle
0932 - 0954 Performing PM in apartment
0956 One worker has maintenance form signed while two are idle
0958 - 1000 Tenant not home - waiting
1002 - 1130 Performing PM in other apartments (replacing screens,
 light bulbs, shower fixtures, etc.) and in downstairs
 laundry room (replacing switches, window pane and unstoppable
 sinks)
1132 - 1138 Loading supplies back into truck
1140 - 1148 Travel back to shop

EXHIBIT II-A-7 (continued)

1150 - 1158 Clean up and idle time
1200 - 1228 Lunch
1230 - 1234 Idle
1236 - 1244 Travel back to Askren Manor
1246 - 1248 Unload supplies from truck
1250 - 1308 Performing PM in apartment
1310 One worker has maintenance form signed while two are idle
1312 - 1324 Performing PM in apartment
1326 One worker has maintenance form signed while two are idle
1328 - 1356 Performing PM in apartment
1358 One worker has maintenance form signed while two move supplies
1400 - 1410 Performing PM in apartment
1414 - 1430 Performing PM and have maintenance form signed
1432 - 1436 Travel to new area at Askren Manor
1438 - 1440 Assisting tenant in a special request
1440 - 1450 One worker obtains supplies while two are idle
1452 - 1504 Break
1506 - 1526 Performing PM in apartments
1528 Loading supplies on truck
1530 Clean up
1532 - 1540 Travel back to shop
1542 - 1550 All three workers intermittantly assist in washing of truck, otherwise they are idle
1552 - 1554 Checking truck stock
1556 - 1558 Idle

Conclusion

From the findings of fact illustrated in this example, several conclusions may be drawn:

- o Most preventive maintenance work performed by the PM team is self-help in nature. Preventive maintenance in housing including changing light bulbs, replacing shower fixtures (shower head and flexible hosing), replacing door stopper, and replacing faucet fixtures.
- o Three men working on one PM team results in nonproductive time. This is very apparent when the paperwork is being completed. (One worker has the maintenance form signed while the other two are idle.) Additionally, with the exception of one replaced window screen, no job every required more than one person.
- o Travel back to the shop for lunch reduces available productive time. Traveling back to the shop for lunch requires approximately 10 minutes each way (20 minutes total) for each of the three workers.

Recommendations

To increase the available productive time as shown in this example, several recommendations may be made. First, as described separately in Section V, an active, ongoing self-help program should be implemented. Such a program would enable the PM team to concentrate their preventive maintenance efforts on more important work or enable them to perform preventive maintenance on more housing units at a quicker pace.

Second, the size of the PM team should be reduced and/or allowed to perform preventive maintenance on two apartments simultaneously. If two apartments are worked on simultaneously, idle time, incurred while occupants sign the maintenance form, for example, would be reduced. In housing, the doors to the apartments on the same floor are not more than 10 feet away from each other. Therefore, if a two man effort is required in any preventive maintenance work (planing a door), only a short walk of 10 feet would be involved.

Third, the PM team(s) should be encouraged to take their lunch break at the work site. The PM truck has a very large covered area on the back. Here tools and equipment are stored. Counter space and chairs are also placed in the back. Since the team took their breaks in their truck, they could surely take their lunch break there as well and save the time involved in travel to the shop.

EXHIBIT II-A-7 (continued)

EXAMPLE N

FINDINGS OF FACT

SHOP: Steam Fitter - one worker

1200 - 1228 Official lunch
1230 - 1236 Travel by foot to job site
1238 - 1356 Direct productive labor - fitting shutoff valve to boiler
1358 Getting material
1400 - 1426 Direct productivity
1428 Idle - talking
1430 - 1436 Direct productivity
1438 Getting material
1440 - 1456 Direct productivity
1458 Idle - talking
1500 - 1516 Direct productivity
1518 - 1520 Picking up tools and material
1522 - 1526 Welding a broken brush holder - not on IJO No. 387-84
1528 - 1530 Idle - ran out of work
1532 - 1540 Putting away tools and cleaning job site
1542 - 1544 Idle - talking
1546 - 1552 Travel back to shop
1554 - 1558 Idle

Conclusion

Craftsperson was 77% productive for the afternoon. Worker ran out of scheduled craft work at 1518. On several occasions worker was observed using a torch to cut pipe and metal without the use of protective goggles.

EXHIBIT II-A-7 (continued)

Recommendation

Shop foreman should anticipate requirements of labor for each task and schedule sufficient work to keep craftspersons active during the entire work day. The importance of taking safety precautions and utilizing safety equipment should be impressed upon each craftsperson.

EXHIBIT II-A-7 (continued)

EXAMPLE 0

FINDINGS OF FACT

SHOP: Paint - two workers

0730 - 0732 Material handling in shop
0734 - 0740 Travel to job site - foreman drops off workers
0742 - 0746 Unloading all material for the day's work
0748 - 0752 One worker cleaning job site, co-worker filling cracks in concrete wall
0754 - 0812 Both craftspersons filling cracks
0814 Getting tools and material
0816 Planning on the job site
0818 - 0830 Painting interior of Bldg 247
0832 - 0834 One craftsperson painting, other cleaning job site in preparation for painting
0836 - 0858 Direct productivity - painting
0900 - 0910 Break
0912 - 1024 Direct productivity - painting
1158 Gathering tools and equipment
1200 - 1228 Lunch
1230 - 1300 Direct productivity - painting
1302 Cleaning job site
1304 Planning on the job site
1305 - 1318 One worker gathering tools and equipment, other worker cleaning job site
1320 Direct productivity
1322 Receiving instructions from foreman

EXHIBIT II-A-7 (continued)

1324 - 1338 Direct productivity - painting
1340 One craftsperson cleaning, one painting
1342 Idle - talking
1344 - 1428 Direct productivity - painting
1430 Receiving instructions from foreman
1432 - 1452 Direct productivity - painting
1454 - 1500 Break
1502 - 1510 Direct productivity - painting
1512 - 1518 One craftsperson painting, co-worker gathering tools, materials and equipment.
1520 - 1532 Gathering tools and equipment
1534 - 1536 Personal clean-up at the job site
1538 - 1540 Idle - ran out of work
1542 Gathering tools and equipment
1544 - 1546 Idle
1548 - 1552 Travel back to shop
1554 Unloading tools and equipment
1556 - 1558 Idle

Conclusion

Craftspersons were 75% productive. At approximately 1512 the craftspersons had completed the assigned IJO work. Craftspersons spent 34 minutes or 7% of craft time gathering tools, equipment, and materials and waiting for the foreman to arrive. Insufficient vehicle support and communication capability led to a loss of productive craft time.

Recommendation

Shop foreman should schedule sufficient work to best utilize craft time. Better communication between craft personnel and shop floor management will help to improve worker productivity. Improved vehicular support will provide craftspersons with the means to move from job site to job site, thereby increasing the availability of craft time for productive purposes.

SECTION III

PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * ENGINEER RESOURCE MANAGEMENT DIVISION * * *

SECTION III
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1.0 SPECIFIC COMMENTS

1.1 The Requirement to Use Engineered Performance Standards (EPS) to Improve Productivity of the Blue Collar Work Force.

A. Finding. In the mid-1950s, the Department of Defense (DoD) directed that standards for maintenance type work should be developed to the maximum extent feasible and applied throughout the military establishment. As a result of this action by DoD, Engineered Performance Standards were developed.

EPS is designed for maintenance-type work and differs from both the private industrial standards for highly repetitive work and the conventional standards for construction work. Industrial standards and construction standards are not applicable to maintenance-type work.

- An evaluation of completed phases of Individual Job Orders for June 1984 revealed the following:

Completed Phases Sampled	58
Total Hours Est. Using EPS	1,367
Phases EPS Utilized	46
Total Hours Estimated	2,116
% Utilization of EPS	88.2

- During FY83 EPS was utilized at DoD RPMAs as shown below:

	<u>DoD</u>	<u>A</u>	<u>DLA</u>	<u>N</u>	<u>AF</u>	<u>MC</u>
Avg. % Usage of EPS for IJOs	56	52	46	56	62	55

- The shop effectiveness of the 58 completed phases revealed the following:

	<u>Sampled</u>	Effectiveness		
		<u>100%</u>	<u>Over 100%</u>	<u>Under 100%</u>
Phases	58	33	14	11
Estimated MH	2116	978	818	320
Actual MH	2104	978	778	348

B. Conclusion

- EPS is being utilized at a substantially higher rate than both the DoD and Army average. The DEH recognizes the importance of EPS utilization.
- The shop effectiveness is questionable. 33 of the 58 phases sampled were completed in exactly the time estimated which is approximately 45% of the total estimated hours. A completed phase or a totally completed IJO was not observed during the work sampling process however the statistics shown would indicate the actual time reported was not totally factual. Completing a phase in exactly the estimated time should be the exception rather than the rule.
- In only one instance did the phase actual time vary by more than 10% of the phase estimated time.

C. Recommendations

- Continue to use EPS to the maximum extent possible, as this will provide the DEH with information necessary to make management decisions.
- The blue collar work force should be strongly encouraged to report actual times for accomplishment of IJOs. This practice will provide both the Planner-Estimator and the shop forces with a measurable indicator as to effectiveness in utilization of Engineering Performance Standards. The blue collar forces are a valuable asset in the determination if an Engineered Performance Standard should be changed. Feedback through periodic training programs for the Planner-Estimators and shop personnel will enhance the productivity and demonstrate a team approach to project accomplishment.

- IFS is scheduled for implementation in the first quarter of FY85. Proper training of all personnel in IFS utilization coupled with accurate reporting should substantially maintain and potentially improve the DEH community productivity. Attachment 1 to this section is provided as a training tool to the DEH to serve as a checklist for Self Evaluation of IFS Training requirements.

1.2 The Requirement to Conduct Facility Component Inspections to Provide Input to the Integrated Facilities System (IFS).

A. Finding of Fact

- A Facility Component Inspection is being conducted on an informal basis with no overall plan of action at the DEH.
- The Schweinfurt Military Community is preparing spaces and will be receiving equipment for installation of IFS commencing in the First Quarter of FY85.
- A Schedule X has been submitted for two positions in the Engineering Resources Management Division (ERMD) for the Facility Component Inspection Program.
- No training program has been established to accommodate the Facility Component Inspection Program.
- The Department of the Army, Corps of Engineers, has issued a Revised Facilities Component Inspection Policy by letter DAEN-MPO-M dated 23 July 1982.

B. Conclusion

- With the onset of IFS installation, a plan of action should be developed for Facility Component Inspections. A training program should be included in this plan of action for all ERMD Planner/Estimator/Inspectors.
- As noted in the 23 July 1982 letter, the primary purpose of facility component inspections is to identify valid maintenance and repair requirements. Identifying and establishing an accurate Backlog of Maintenance and Repair (BMAR) is an important part of an effective RPMA management system. Establishing and maintaining the facility inspection program will provide an accurate and reliable statement of BMAR for the Schweinfurt Military Community. Using the standard Facilities Engineering work management policies, procedures, forms, and terminology when the Facilities Component Inspection procedures are established will insure accurate input of requirements into the work management system for planning, programming and accomplishment.

C. Recommendations

- Develop a plan of action for Facility Component Inspections using the 23 July 1982 letter as guidance.
- Develop and conduct a training program for Planner/Estimator/Inspector personnel for the Facility Component Inspection Program.
- Follow-up with higher headquarters to obtain approval of the two positions in ERMD for the Facility Component Inspection program.

1.3 The Requirement to Conduct Weekly Shop Workload Schedule Meetings

A. Finding of Fact

- Schedule meetings are held Thursday of each week.
- Attendees are the Deputy DEH, Chief ERMD, Chief MESB, Chief Buildings and Grounds and Utilities Divisions, Chief Scheduler, MESB, and Planner Estimators as needed.
- All attendees review and analyze the proposed next week schedule prior to the meeting.
- Material is available for scheduled IJ0s.

B. Conclusions

- The scheduling process is well coordinated throughout the DEH. The preliminary coordination done by the Chief Scheduler is commendable in that a very efficient schedule meeting is conducted and a good schedule for the following week is the result. The schedules are followed by the shops during the following week.
- The available manhours scheduled for SOs, IJ0s and SM are based upon input from the various attendees. For example, scheduled manhours for service orders is based upon the backlog per shop and is increased or decreased as appropriate.
- The schedule meetings are conducted very efficiently by the Deputy DEH.

C. Recommendation

- Continue the excellent scheduling effort.

1.4 Review of Service Orders Awaiting Material

A. Finding of Fact

- 125 Service Orders (SOs) were awaiting material as of July 11, 1984.
- A service order remained in the shop an average of 17 days prior to an attempt to accomplish. Range 0-102 days.
- A service order remained in work reception an average of 15 days awaiting material ordering. Range 0-48 days.
- 1 SO was Priority one and the remainder was priority 2 and 3.
- Material was placed on order an average of 32 days after the service order was written. Range 1 to 122 days.
- SO material required were such items as:
 1. PVC tiles
 2. Glass-plain, thermopane and plexi
 3. Particle board
 4. Wall switches
 5. Fuses
 6. Circuit breakers
 7. TV cable
 8. Light fixtures - fluorescent and incandescent
 9. HW heater connection assemblies
 10. Shower rods
 11. Flush tank covers
 12. Floor drain covers
 13. Sinks
 14. Soap dishes
 15. Locks
 16. Keys
 17. Door paneling
 18. Fire extinguishers
- 96% of the service orders awaiting material have had material on order for 30 days or more with a maximum of 9 months.

B. Conclusion

- The service orders are remaining both in the shops and in work reception for an average of 32 days. This time plus the period of time material has been on order (30+ days), have the customer waiting in excess of 60 days for service order accomplishment.
- The type of material required for over half of the SOs awaiting material are routine items and should be carried in the supply warehouse.

- The apparent cause of the delay of material ordering is a result of the excessive workload of the ERMD material coordinator who, in addition to ordering SO material, is responsible for tracking all material being consumed by shop forces, receiving the material into the shop supply spaces, issuing all material to the shops for projects commencing each week, follow-up of non-receipt of material, logging all transactions to and from supply, and periodic inventory of material in shop supply spaces. A realignment of job responsibilities is required.

C. Recommendations

- Shop foremen and personnel should review each service order upon receipt to determine material availability. It is realized that some of the SOs will require a site visit to determine requirements, however the majority can be screened in the shop for material availability. A realistic target for returning SOs to ERMD for material ordering is one to five days.
- The material coordinator in ERMD should place orders for material within five days of receipt of the SO from the shop. See Section VI for discussion and recommendation for manpower assistance to the material coordinator in ERMD.
- Review the common type material requirements. See Section VII for discussion and recommendation concerning warehouse stock and shop stock.

1.5 Review of the Management Engineering and System Branch (MESB).

A. Finding of Fact. The following functions were reviewed and discussed:

- The Annual Work Plan (AWP) and Resources Management Plan (RMP) for Schweinfurt/Bad Kissingen Military Community is prepared according to Army Regulations and local guidance from VIIth Corps Letter of Instruction (LOI).
- Performance analysis is accomplished relating to Individual Job Orders (IJOs), Service Orders (SOs), and Standing Operation Orders (SOOs) as to effectiveness of actual manhours versus estimated manhours.
- Records and reports are prepared each month and quarter for backlog of IJOs in work weeks, including manhours awaiting material, scheduling and in progress; status of JORs awaiting approval, estimating or IJO preparation; number of SOs completed with the average amount of manhours expended per SO, and BMAR to VIIth Corps.
- The branch is responsible for implementation and operation of IFS for the DEH, scheduled to commence in FY85 (Oct. 1, 1984).

B. Conclusions

- The coordination of AWP and RMP inputs from DEH Divisions and units is accomplished on a timely basis. The plans are continually updated for input into the follow-on year plan. The quarterly actual performances versus those planned in the AWP are evaluated and deviations are justified when necessary. These plans are effectively used in the overall management of the DEH operation.
- The quarterly/monthly reports and performance analyses are effectively used to manage the day-to-day DEH operations.
- The implementation of IFS is in progress. The basic plan of action for IFS implementation contained in the ERMD SOP is being followed and inputs are in preparation for loading into the system.

C. Recommendation

- Continue the excellent performance by MESB in the report preparations, performance analyses, and IFS implementation process.

1.6 Review of the Budget Branch

A. Finding of Fact. The following functions were discussed and reviewed:

- Preparation of Local National Pay, Equipment Rental, Unconstrained Requirements, Facilities Engineering Technical Data, Command Operating Budget and Commitment Status Reports for the DEH and the Military Community are accomplished according to regulations.
- All documents are reviewed and actions initiated for provision of funds from reimbursable customers. Follow-up is accomplished on projects requiring additional funding.

B. Conclusions

- A good working relationship exists within the DEH and with the Military Community for the preparation of all reports relating to the cost accounting and fund control areas.
- An efficient and professional approach is evident in conduct of the day-to-day budget operations throughout the community.

C. Recommendations

- Continue the excellent performance of all Budget, Cost Accounting, and Fund Control and Statistical Services functions for the Director of Engineering and Housing.

1.7 Review of the Construction Army Engineers (CARES) Troop Construction Program

A. Finding of Fact

- Three to four troop construction projects are planned and programmed each fiscal year for accomplishment.
- Program liaison is done by the CARES NCOIC and the Chief Estimating and Facilities Inspection Branch
- Detailed project specifications are provided to each unit performing Troop Construction.
- Skilled craftspersons are utilized to provide on-the-job training for Engineer Troop Units.
- A SOP for the Troop Construction Program does not exist.

B. Conclusion

- A well coordinated program for Engineer Troop units is in place at the Schweinfurt Military Community.
- The CARES program is well planned by the NCOIC and the ERMD Estimating and Facilities Inspection Branch. The NCOIC provides all logistic liaison with the Military Community and the Engineer Units scheduled to accomplish the projects.
- An interview was conducted with the NCOIC of a troop unit who just completed a construction project. The comments were favorable regarding all the support provided to the unit and the increases in skill levels attained by the unit members. The provision of detailed specifications and the opportunity to have assistance from the civilian DEH craftspersons were favorably noted.

C. Recommendation

- Continue utilizing troop units for this program.
- Develop an SOP for the conduct of this program. This will serve as a checklist for both the DEH and the Engineer Troop Units involved regarding support to be provided and the responsibilities of all concerned.

1.8 The Requirement to Apply Energy Conservation Measures at the Schweinfurt/Bad Kissingen Military Community

A. Finding of Fact

- An Energy Conservation SOP has been issued by the DEH for the Military Community.

- Quarterly energy conservation inspection and technical energy inspection are conducted.
- Targets for electricity and fuels are set and consumption comparisons are made each month.
- A quarterly awards program is conducted in conjunction with the inspection program.
- The DEH is personally involved in the Community Energy Conservation Program.

B. Conclusion

- The Military Community has a very comprehensive SOP for Energy Conservation. The program has the total support of the Commander of the Schweinfurt Military Community.
- The awards program is favorably received by the community units.
- The DEH continually and aggressively promotes energy conservation through the Community Medias and the energy Conservation Committee.

C. Recommendation

- Continue the total Energy Conservation Program.
- Continue maintaining the electricity and fuels targets.

ATTACHMENT III-1
SELF-EVALUATION OF
IFS TRAINING REQUIREMENTS

SELF-EVALUATION OF IFS TRAINING REQUIREMENTS

FEMS MODULE

Functional Area. Craftspersons (WLs, WGs)

Reference. IFS Users Manual Volume IIIB Chapter Four (4)

Skill Required. Proper completion of L&E Cards

Summary. The Labor & Equipment (L&E) Card is the most important input to the Integrated Facilities System. It is designed to accomplish the following:

1. Capture the time and cost of all personnel assigned to the Facilities Engineering Organization, both Military and Civilian (except Firefighters)
2. Provide the basis for utilization data and rental/depreciation costs of all FE assigned M&S equipment and all borrowed M&E equipment.
3. Provide actual person hour data for measuring performance.
4. Provide the primary source of workload data for preparing Performance Work Statements.

Personnel Affected. All DEH employees identified in the STANFINS K9200 account. This is normally all except 56 hour per week Firefighters.

Evaluation Procedures. Random Sample 100 L&E Cards from each shop and Overhead Division/Branch.

1. Do the daily L&E Cards total 8 hours, or if more than 8 hours, does a "B" appear for the excess over 8 in card column 49?
2. Do the L&E Cards turned in weekly or biweekly total 40 or 80 hours respectively or have a "B" in column 49 for hours in excess of 40 or 80?
3. Are skill codes utilized?
4. Is column 55 filled in? (If it is blank a majority of the time for craftspersons, they are not reporting their time properly.)
5. When service orders are performed, are the following filled in correctly:
 - Component Code (Columns 42 & 43)
 - Task Code (Columns 44 & 45)
 - Task Units (Columns 46 & 47)

6. What is the Error Rate? (It should be under 1%.)
7. Visit the shops and observe the following:
 - A. When are L&E Cards filled out by the craftspersons?
 - Completion of each job
 - End of day
 - They don't, the Foreman does
 - B. Randomly select 4 or 5 craftspersons. Ask the following questions:
 - Have you received training on filling out L&E Cards?
 - What is the purpose of the L&E Card?
 - Did you know that filling out the L&E Cards correctly can save your job?
 - Does the Foreman or leading man fill out your card for you?
 - How do you fill out your card when you work overtime?
 - Do you understand how to fill in your L&E Card to record multiple task codes/units?
 - C. Is there a list of Labor Codes (see page 4-15 of reference) posted in the shop?
8. Randomly check 15 vehicles.

Is there a Task Code list in the vehicle?

Functional Area. Shop Foremen (craft shops) (WSs)

References.

1. IFS Users Manual Volume IIIB, Chapter four (4).
2. IFS Users Manual Volume IIIA, Sections 6.10, 6.19, 6.20, 6.21.

Skill Required.

1. Proper completion of L&E Card
2. Understanding of:
 - Service Order Backlog Report (FJ0)
 - Shop Performance Report Service Orders (FK0)
 - Shop Performance on Completed IJ0s (FL0)
 - Shop Backlog and Workforce Distribution Report (FN0)

L&E Cards. Foremen should be thoroughly versed in the utilization of L&E Cards. The functional checklist for craftspersons may be utilized, in addition, the following should be ascertained:

1. Do foremen review, verify the accuracy and sign the L&E Cards?
2. Do foremen understand the use of the Labor Codes in Table I, page 4-15, of IFS Users Manual Volume IIIB?
3. Ask the Foremen: "If three of his craftspersons are sent to work in another shop, how do they record their time at the end of the day?"

Records Analysis.

1. Service Order Backlog Report (FJ0)
 - A. Does the Foreman have a copy of the report for his shop?
 - B. Is the report substantially correct? Are there jobs (SO) listed that, in fact, have been completed weeks or months ago?
2. Shop Performance Report Service Orders (FK0). This is a monthly report that shows the effectiveness of shop personnel in completing standard service order tasks. It also reflects the effectiveness of the shop foreman in handling resources and the ability of ERMD in recognizing backlog and scheduling requirements. From this report the foreman can track, on a monthly basis, the average time per service order task, shop stock cost per hour, and shop effectiveness.

The Foreman should also review the individual task codes on this report. When actual and standard times vary by more than plus or minus 10%, the foreman should bring this to the attention of ERMD and ERMD should investigate the cause.

A. Do the foremen receive a copy of the FKO Report?

B. Do the foremen:

- Know how to compute average time per service task?
- Understand percent effective?
- Know where the standard hours come from?
- Know where the actual hours come from?

C. Do the foremen monitor the:

- Average time per service order task
- Shop stock cost per hour, and
- Shop effectiveness on a monthly basis?

3. Shop Performance on Completed IJ0s (FLO). This weekly report gives a rundown of all in-house IJ0s completed by each shop. It should be reviewed by shop foremen to evaluate the performance of their personnel. If the shop foremen feel that the time estimates are inaccurate, ERMD should be notified.

A. Do the foremen receive copies of the FLO Report?

B. Do the foremen understand the Report and use it to monitor their craftspersons performance?

4. Shop Backlog and Workforce Distribution Report (FNO). This report is generated weekly to serve a multitude of functions. Foremost, this report shows foremen and other managers how time was spent, both by area and skill, within their operating organizations.

A. Do the foremen receive copies of this report?

B. Do the foremen understand how to utilize this report?

Functional Area. Budget

Reference. IFS Users Manual Volume IIIA and IIIB and IIA

Skills Required.

1. Proper completion of L&E Cards.
2. Detailed knowledge of the following uniques files:
 - Military Pay XJD (F04)
 - General Schedule - Wage Board Benefit Percent Record XJE (F05)
 - Family Housing AMS/APC Record XJG (F07)
 - STANFINS Interface APC Record XJN (F12)
 - Labor Header Update XFX (FU1)
 - Functional Group Record XJB (F02)
 - Family Housing Record XJJ (F09)
3. Understanding the use of the following cost control reports:
 - Special Projects Report (FQ0)
 - Standing Operations Orders Report (FMO)
 - Family Housing Costs Report (FRO)
 - Functional Cost Reports (FSO)
 - Reimbursable Job Cost Report (FT0)
 - Family Housing Prestige Quarters Report (FU0)
 - Preventive Maintenance Report (FVO)
 - Minor Construction and Alteration Report (FX0)
 - Contract Cost Report (CS0)

L&E Card Completion. All DEH personnel (except 56 hour per week Firefighters) must be familiar with the purpose and procedures for filling out L&E Cards. If IFS is to allocate costs properly, all DEH personnel must account for 2080 hours per annum plus any overtime or other differential pay received.

1. Do Budget Personnel understand how to fill out L&E Cards?
2. How often are they filled out?
3. How often are they turned in?
4. Does the Budget Chief review them for accuracy and completeness?

Detailed Knowledge of Uniques Files. There are eight transactions which must be prepared and processed in the BASOPS Environment before cost data may be submitted to IFS. They contain information necessary for the system to perform cost calculations. Five of these files are the responsibility of the Budget Branch.

1. Military Pay XJD (F04). Establishes the hourly pay scale for military personnel by rank. The record is mandatory and distributes the cost of labor entered on the L&E Card (FM1 or 2 transaction) for assigned, loaned, or borrowed military personnel performing work for the FE/DEH. The military pay rates are provided by FESA. The Budget Branch must immediately update the XJD (F04) file when notified of changes to military pay, and verify the entire record for accuracy and completeness.

A. Obtain a copy of the XJD portion of the Uniques Table (FRT) showing current information. Obtain a copy of the latest correspondence from the installation FESA (or the installation F&AO) which identifies changes to military labor rates. (NOTE: AR 47-108 is the formal authorization for changing the rates; however, the lagtime for its publishing/distribution may necessitate implementation of the rates prior to receipt of the regulation change.

(1) Are the current hourly rates correct?

2. General Schedule - Wage Board Benefit Percent Record XJE (F05). Establishes percentages for benefits which are applied to cost of jobs for productive labor. Included are insurance, retirement, and FICA benefits. This record is used by the computer to calculate the amount of money which must be prorated to each job to account for employee fringe benefits.

A. Obtain a copy of the XJE portion of the Uniques Table (FRT) showing current information. Obtain a copy of the latest correspondence from FESA (or the installation F&AO) showing the benefit percentages and how the percentages were derived. The correspondence should specify the date when the new percentages were effective and when they were input to IFS.

(1) Are the current percentages correct?

(2) Were they promptly input into IFS?

3. Family Housing AMS/APC Record XJG (F07). Establishes Account Processing Codes (APC) to be used in the financial system interface. Established for detailed Family Housing Cost Accounts and Summary Level Engineering Cost Accounts. This record is used by the computer program to distribute FE Labor & Equipment expenses to appropriate APCs within the purview of the STANFINS interface. This table provides the vehicle which enables IFS expenses to be reflected by both Base Operations Engineer AMS Codes and Family Housing AMS Codes and to be passed to STANFINS by APC. In IFS operations, expenses incurred against Family Housing Facilities are normally automatically reimbursable. These expenses are reported in the following FEMS reports:

- FH Reimbursable Cost Report - FRO (by FH AMS)
- Functional Group Cost Report - FSO (by Engr AMS)
- Reimbursable Job Cost Report - FTO (by User Code)
- FH Prestige Quarters Report - FUO (by Facility number)

A. Obtain a copy of the XJG portion of the Uniques Table (FRT) showing current information. Obtain a copy of the latest correspondence identifying the required APCs assigned by the installation F&AO. This correspondence should specify the required changes to the Automated Files and the date when the changes were effective.

(1) Are the current APC correct?

4. STANFINS Interface APC Record XJN (F12). Establishes a cross-reference table relating IFS detail level functional Group Codes to the AR 37-100-XX Detail level AMS codes and the applicable Engineer Direct APCs. (Optional Record). This table relates IFS Functional Group Codes to APCs to permit the processing of labor and equipment utilization data to STANFINS.

A. Obtain a copy of the latest correspondence from the installation F&AO which identifies APC changes, or from FESA identifying Functional Group Code changes. Obtain a copy of the XJN portion of the Uniques Table (FRT) showing the current information.

(1) Are the Army Management Structure Codes (AMS-CD) correct?

(2) Are the Account Processing Codes (APCs) correct?

5. Labor Header Update XFX (F11). Establishes the Wage Board Grade 10, Step 2, rate and general schedule maximum overtime rate (per Title 5US Code) to be used in cost calculations of Hazardous Duty and Overtime Pay respectively. When applicable, it also establishes the Cost of Living Allowance (COLA) for the installation.

A. Obtain a copy of the latest correspondence from the installation F&AO which identifies Wage Board and General Schedule rates. Obtain a copy of the XFX record showing current information and verify the MAX-OT-RATE-HR (CC 10-13), WB10-2-RATE-HR (CC 14-17) and DATE-OVHD-COMPUT (CC 18-23).

(1) Are the Rates correct?

6. Functional Group Record XJB (F02). Establishes a table of valid functional group codes which relate to detail level J and M Account Codes in AR 37-100-XX.

A. Obtain a copy of the XJU unique file. Find the "J" or "M" functional group codes (position 5 through 9) in the XJU table. List those having a "1" in card column position 70. Does the XJB (F02) file list all those contained in the XJU table?

B. Is there a functional group code for PM material and shop stock material in the XJ0 table?

7. Family Housing Record XJJ (F09). Establishes percentages of work by functional group to be prorated to the different family housing categories.

A. Does a F09 (XJJ) file exist?

Cost Control Reports

1. Special Projects Report (F00). The Special Projects Report is the most complex of the FEMS Reports. It is processed daily. The report is broken into two sections. The first contains only special projects ("P" type code) which are shown from their inception until their completion. The second section contains all other conventional IJ0s ("J" type code) from the time they attain an installation-determined percentage complete (Input on the FMJ0 Update Transaction XFY (FUL); see VOL IIA page IIA-B-137) based on actual vs estimated hours) until they are also completed.

A. Each job is divided into three sections.

(1) The first is a header line which shows:

- Document Number
- Job Description
- Fund Citation
- JOR Date

(2) The second shows:

- Job Phase
- Facility Number
- Break out showing:
 - . Estimated
 - . Obligated
 - . Actual Data

(3) The last section shows:

- Job Totals
 - . Estimated
 - . Obligated
 - . Actual

B. Actual Expenses come from:

- L&E Cards (Labor & Equipment)
- Material Issue/Turn In
- Contract Data by Phase
- Actual Resources Input, and/or
- Fuel/Sales Input Transactions (See VOL IIIB)

C. For purposes of capitalization and job accounting, the costs are broken down into two areas:

- Funded Costs
- Unfunded Costs (military labor/equip. dep.)
- Total Costs

D. All completed jobs are displayed for 30 days then dropped from report.

E. Two situations will generate a flag to appear.

- Job involving a 10% or greater material cost overrun.
(Flag right of Material column)
- Jobs having no transactions for week or more.

F. This report satisfies requirements of:

- AR 415-35
- AR 420-21

G. Does Budget obtain daily copies of the Special Projects Report?

- Do at least 3 persons or 50% of the Budget Branch personnel understand how to read the Special Projects Report?
- Do the Budget personnel understand from where the estimated and actual costs come and how they are computed?
- Do Budget personnel verify the type codes and functional group codes?

? Standing Operations Order Report (SOO). This report is intended to provide the scheduler and division chiefs with the status of progress on all SOOs as well as to give the Budget Branch up-to-date information on cost expenses against specific SOOs. There are several major types of SOOs. They are:

- SOOs to accumulate work costs (may or may not count repetitive tasks)
- Administrative SOOs (accumulate personnel time)
- Shop stock SOOs (act as suspense account for material)

SOOs remain on this report for a period of 30 days following the job completion entry.

The report displays both in-house and contract phases.

- Does budget receive copies of and monitor this report for?
 - . other fund citation
 - . functional group code
 - . reimbursable code
 - . cost data

3. Family Housing Cost Report (FRO). This report is designed to accumulate all costs for work performed on Family Housing on a monthly basis. It shows both the cost of the most recent month and the year to date costs.

The report provides the Budget Branch with a detailed cost summary to determine FE (DEH) work force contribution to Family Housing. Report total should be cross-checked against totals for the Family Housing reimbursable codes on the Reimbursable Jobs Costs Report (FT0). These totals should equal those on the Family Housing Cost Report (FRO). However, if costs of utilities and engineering services are prorated to the various Family Housing costs accounts using the Family Housing Record XJJ (F09), the prorated costs will not appear on the Reimbursable Costs Report. To determine the validity of such costs, the Standing Operations Orders Report (FMO) and the Contract Status Report (FDO) must be used and manual calculations made to verify the costs reflected on the report.

- Does Budget receive a copy of the report?
- Do Budget personnel understand how to utilize this report?

4. Functional Cost Reports (FSO). This report shows on a monthly basis total FE expenses (both reimbursable and non-reimbursable) for the preceeding month and the fiscal year-to-date. All expenses are included except:

- TDY
- PCS travel
- Office supplies
- Transportation of things
- Awards

This report provides a summary level picture of FE costs to date. When compared to the RPMA Financed/Unfinanced Requirements Report (FURP), it enables the Budget Section to continuously evaluate expenses versus budget estimates. It also provides the Budget Branch a tool which can be used to advise the FE in budgeting actions based on accurate, up-to-date data.

At present, the use of this report is restricted.

- Do not investigate use of the report.

5. Reimbursable Job Costs Report (FT0). This is a monthly report which presents the total costs incurred against each reimbursable account for the preceeding month. If an FE direct fund APC has been cited for a job, a manual billing should be made for all current month costs displayed on this report. If a cross reference APC has been cited on a given job, (via the material issue and turn in XFE or XFN), a manual billing should be prepared for the current month costs associated only with contract costs since all other costs will already have been processed as reimbursements through the STANFINS and SAILS interfaces.

Costs displayed in the SO line are to be treated exactly as described above, with one exception. Material costs, when shown, must always be handled on a manual billing (i.e., the system cannot process these through the SAILS interface).

All costs displayed on the PM line must be processed as a manual billing with the exception of Family Housing. For Family Housing, only material costs and contract costs associated with PM must be billed manually.

- Does Budget maintain copies of this report?
- Does Budget understand how to use this report?

6. Family Housing Prestige Quarters Report (FU0). The purpose of this report is to provide a summary of expenses on the quarters as required by Family Housing regulations. Specifically:

- Prestige quarters
- General officer quarters
- Oversize quarters

The report contains a single line for each job cost that was accrued (by document number) during the month (current month) against every applicable facility. This includes IJOs, SOOs, SOs, PM and contracts. There are also total lines reflecting all expenses for the previous month year-to-date, the current month, PM current month, and SO current month for each facility.

The report does not include the cost of utilities expended in support of prestige quarters. This data must be manually annotated.

- Does Budget maintain a file of these reports?
- Are the reports utilized?

7. Preventive Maintenance Report (FVO). The purpose of this report is to provide PM expenses by element of expense for:

- Each PM job performed (by document number) on a facility since the last report cycle.
- Each facility since the beginning of the FY.
- The entire installation since the beginning of the fiscal year.

In addition, total civilian and military labor hours expended on PM since the beginning of the FY is provided.

The L&E cards are the basic source document for all information.

- Does Budget maintain a copy of this report?
- Is the report verified and utilized?

8. Minor Construction and Alteration Report (FX0). This report provides monthly detailed cost expenses for all work classified as minor construction and alteration ("L") work by Facility Class and Construction Category Code (F4C) and numerically sequenced by facility number within each F4C. The primary purpose is to provide visibility of total expenses on "L" work to insure that statutory limitations for any given year are not exceeded.

9. Contract Cost Report (CS0). This report provides detailed cost information by contract including modifications.

Functional Area. Work Reception (Service Order Clerks)

Reference. 'IFS Users Manual Volume IIIA & IIIB

Skills Required.

Proper completion of L&E Cards

Ability to understand and fill out service order requests (DA Form 4287 or equivalent local form)

General understanding of Facilities Engineering Work Request (DA Form 4283) and the Facilities Engineering Work Order (DA Form 4284)

Working knowledge of the following job status and workload reports:

- Job Order Request/Individual Job Order Status Report (FAO)
- Facility Reference Report (FWR)
- Service Order Register (FGO)

Labor and Equipment (L&E) Card

1. See functional area summary for budget.
2. Do the service order clerks turn-in L&E cards?
3. How often?
4. Does the work reception supervisor review the L&E cards?

Service Order Request (DA Form 4287 or Equivalent). Service Orders are generally written for emergency or routine maintenance that can be accomplished in 24 hours or less. (It is permissible to go up to 40 hours and there is no limit on emergency work.) Family Housing work should be limited to 16 hours and/or \$350 materials. A complete description of the service order procedure is found in the IFS Manual Volume IIIA, Section 4-6, commencing on page 4-108.

Randomly sample 35 service orders processed during the past week.

1. Are work receptionists familiar with the use of "Special number" for "J" or "M" work in Family Housing? (See IFS Users Manual Volume IIIA, Appendix A, Page A-6).
2. Do work receptionists understand the definition of "J", "K", "L" and "M" work?
3. Is the reimbursable code (columns 24 and 25) filled in on all reimbursable work? (i.e. Family Housing, Commissary, etc.)

4. Is there a logic table available for establishing priorities? Who authorizes emergency work?

5. Do the work receptionists have a list of shop codes and skill codes posted? Do they use the skill codes? How often is "X" used in column "34"?

6. Is there a list of task codes posted? Is the list complete? How often is task code 99 used?

7. Have the service order clerks ever been given any indoctrination with craftsperson performing SO?

8. Is the number of task units filled in? Are task units mixed?

9. For "J" or "M" work, is the functional group code entered? Do SO clerks know what a functional group code is?

10. Is the other fund citation (XFP transaction) filled in? Is it correct?

NOTE: Obtain a copy of AR 37-100-YR from Budget -- Randomly select 35 SOs to see if the XFP transaction is used extensively. If unique files are correct, this transaction is normally not required.

Non-IFS

It is very important to record location (Room number) and telephone number. Is this being accomplished?

Facilities Engineering Work Request (DA Form 4283). This form is prepared by customers to establish requirements for work. All work accomplished using FE resources requires the prior submission and approval of either this form or a Service Order (DA Form 4287). The form is divided into three sections:

1. The work request transaction XFA/XFB which is initiated by the customer to show detailed work requirements, justification, and impact if work is not accomplished. This form is completed by the work receptionist;

2. The forward for approval transaction which is completed by FE personnel to submit the request to the approving authority; and

3. The approval action transaction XFC which is used to show approval/disapproval action on the requested work.

Detailed information on DA Form 4283 is found in the IFS Users Manual Volume IIIA, pages 4-2 through 4-19.

1. Does the work receptionist understand the use of codes "A", "C", and "D" in column 4.

2. Does the work receptionist understand the use of codes "P", "J", and "S" in column 13?
3. Is the work receptionist familiar with AR 37-115? Is there a copy of AR 37-115 readily available?
4. If a work request involves more than one facility, does the work receptionist understand what to do?
5. Does the work receptionist have a list of valid facility numbers and suffixes? Are customer submissions verified against this list?
6. Does the work receptionist understand the use of "other fund citation"?

Facilities Engineering Work Order (DA Form 4284). This form is used to record the estimate and pertinent data concerning in-house Individual Job Orders (IJOs), Standing Operations Orders (SOOs), and special projects. The form is not utilized for SOs or contracts, except for reopening of the job. The form is not recommended for use with buildings and structures PM. The form is basically divided into two sections:

1. The work order transaction dates (XFD) which is used to input significant job related status dates, SOO effective dates, remarks, etc; and
2. The work order estimate by phase (XFE, XFF) which is used to record the job estimate data.

The work order estimate by phase (XFE) must be preceded by a work request (XFA) and approval action (XFC) before the work can be processed. If not, the XFE transaction will be rejected. Detailed information on DA Form 4284 is found in the IFS Users Manual, Volume IIIA, pages 4-20 through 4-54.

1. Does the work receptionist understand the priority system as outlined in DA Pam 420-6?
2. Does the work receptionist understand functional group codes? Are they entered for work classifications "J" and "M"? What does the work receptionist do if a job involves several phases of work involving M&K work?
3. Is the work receptionist familiar with the XJB unique table? Does the work receptionist have a copy of the XJB (F02) table?
4. Does the work receptionist understand how the "dates to" work? (rather than overlaying, a new date can be added up to four times).
5. Does the work receptionist understand how to close out a job? When? How to reopen a job?

6. Does the work receptionist understand the use of the "Family Housing Indicator" (column 68)?

7. Does the work receptionist receive a copy of the EFO (error) report?

NOTE: The XFE/XFF transaction is discussed in the Planner/Estimator Functional Area.

Functional Area. Planner/Estimators (WDs) and Work Reception

Reference. IFS Users Manual Volume IIIA

Skills Required.

Proper completion of L&E Cards

Understanding of Work Order Estimate by Phase (XFE/XFF)

Work Order Estimate by Phase (XFE/XFF). The purpose of this input is to record the work order estimated data as calculated by the estimator. A detailed description of the work order estimate by phase is found in the IFS Users Manual, Volume IIIA, pages 4-30 through 4-56.

1. Do the P/Es and work reception personnel understand the use of the changed codes "A", "C" and "D"?
2. When can "D" be used? (See ref. page 4-30, para. (2)(b)).
3. When are alpha-alpha phases utilized?
4. How are phases reflected on the output reports?
5. Do single phases contain more than one facility or component?
6. Do the P/Es understand that reimbursable work must be isolated?
7. If both in-house civilian labor and troop labor are being utilized on a work order, how are the estimates entered?
8. Do P/Es understand that different classification codes cannot be combined? (e.g. "K" and "L")
9. Do P/Es utilize craft skill codes properly? Do P/Es utilize helper and laborer skill codes for helper and laborer work? Are skill codes by shop available?
10. Do P/Es understand the use of assigned proper component codes?
11. Are reimbursable codes being utilized properly? Are the special facility numbers for "J" and "M" work in Family Housing being entered?
12. Are the proper "recurring/deficiency (R/D)" codes being utilized?
13. Are inspection codes being entered?
14. Are the P/Es familiar with AR 415-35 (est. equipment rental costs)?
15. Are depreciation costs being estimated for "L" work?

16. Do the P/Es understand the use of the funded design indicator?
17. In regard to the XFF transaction, do P/Es utilize the task code for repetitive type operations? (S00 type work) This can be important in gathering workload data.
18. Do P/Es understand the purpose and use of the "other fund citation"?

Functional Area. Director/Deputy Director; Operations Officer; Chief ERMD; Division Chiefs of Operating Division

Reference. IFS Users Manual Volume IIIA, IIIB, IIA

Skills Required.

Ideally, an in-depth knowledge of how IFS functions.

Realistically, a general knowledge of IFS and how the information contained therein may be utilized to optimize resources.

Summary. IFS output reports provide a large amount of useful information. Currently, the information is presented in numerous reports, many of which are bulky and difficult to use if untrained. However, with minimal effort, a trained analyst can extract information from the reports and provide that information to DEH managers in easy-to-understand tabular or graphic format. Exhibit "A" contains a series of graphs that display valuable information for DEH management. Each graph is briefly discussed below:

1. Backlog of Jobs (IJ0s). The FAO report provides the status of jobs by requestor ID. Extracting information from this report and displaying it monthly in graphic format will provide DEH management valuable information regarding backlog and backlog trends. Periodic checks of the information extracted from the FAO report should be accomplished by tabulating the number of IJ0s in estimating, design, awaiting material, and scheduling.

Responsibility for Preparing: Work Reception

Responsibility for Verifying: MESB

See Exhibit A-1 for Example

2. Jobs Awaiting Material (IJ0s). The FBO report provides management with an indication of the effectiveness of their supply procedures. The graphic display of this information on a monthly basis will provide management with trends and indicate when a more in-depth investigation of problem areas is required.

Responsibility for Preparing: Supply

Responsibility for Verifying: MESB

See Exhibit A-2 for Example

3. Status of Service Order Backlog (FJ0). This report displays all service orders that have not been completed. Through graphic displays of this information, management can spot trends and take corrective action such as shifting resources.

Responsibility for Preparing: Scheduler

Responsibility for Verifying: MESB

See Exhibit A-3 and A-4 for Examples

4. Shop Performance Report - Service Orders and Preventive Maintenance (FK0). This report shows the effectiveness of shop personnel in completing standard service order tasks or, conversely, the failure to develop proper task codes and standard times. Through minor manipulation of the data in this report, the following information can be displayed for each shop:

- Shop Stock Cost Per Hour (See Exhibit A-5)
- Percent Effective (See Exhibit A-6)
- Task Code Percent Utilization (See Exhibit A-7)
- Average Time Per SO Task (See Exhibit A-8)

Responsibility for Preparing: MESB

5. Shop Performance on Completed IJ0s (FL0). This report shows shop effectiveness in completing in-house IJ0s. It provides feedback of planned vs actual work, and is an excellent source for evaluating both shop performance and planner/estimator performance. A graphic display of this information will provide valuable information to management.

Responsibility for Preparing: MESB
See Exhibits A-9 and A-10 for examples

6. Shop Backlog and Workforce Distribution Report (FNO). This report provides a wealth of information for DEH management. The following can be displayed in graphic format for the installation and by shop.

- Backlog of work in shop days (See Exhibit A-11)
 - . in shop
 - . awaiting scheduling
 - . awaiting material
- Percentage of backlog by category (See Exhibit A-12)
 - . SOs
 - . IJ0s
 - . PM/CM
 - . SOOs
- Percentage sick leave (See Exhibit A-13)
- Percentage work force availability (See Exhibit A-14)

Responsibility for Preparing: MESB

7. Shop File Report (FS1). This report reflects labor cost by individual shop. The graphic display of the following information should be useful to management:

- Shop effective rate
- Shop overhead rate

Responsibility for Preparing: MESB
See Exhibit A-15 for example

8. Standing Operations Orders Report (FMO). This report provides the Budget Branch up-to-date information on accumulated cost against specific SOOs. By tracking the actual costs vs the estimated, costs management can, if required, reprogram funds. It would be particularly useful to tract estimated vs actual shop stock costs.

Responsibility for Preparing: Budget
See Exhibit A-16 for example

9. Reimbursable Job Costs Report (FT0). This report presents total costs incurred against each reimbursable account for the preceeding month and year-to-date.

Responsibility for Preparing: Budget
See Exhibit A-17 for example

Functional Area. Management Engineering and Systems Branch

Reference. IFS Users Manuals

Skills Required. Detailed knowledge of IFS. The Chief MESB and his/her key assistants must be graduates of the Integrated Facilities System course taught by ALMAC.

It is difficult for a facility to evaluate its own MESB. Outside assistance from the MACOM or FESA is recommended. The following checklist may be used as a guide.

1. What courses have the MESB Chief and the IFS Project Officer/Quality Control Clerks attended? When?

2. Does the MESB Chief understand the purpose of the system unique tables listed below, and how to maintain them? (See IFS Users Manual, Volume IIA for details.)

A. XJA (F01) - User Code/Requestor ID - Installation Number Record. This Table establishes a two digit identifying code for customers, It also identifies location, sorts jobs, and establishes cost relationships in FEMS and RPMA programming, and provides a source for retrieving Assets and RPMA data.

1. When was the XJA table last updated?
2. If the activity has sub-installations, do separate sub-installation numbers exist in card column 7-11?
3. Are the appropriate numbers (card columns 12-21 correct?) (See AR 37-100)
4. Are the program element codes correct?
5. Are the Family Housing reimbursable codes correct?
6. Is the unit identification code entered correctly?
7. Is the tenant command code correct?
8. Is the appropriation cited correct?

B. XJB (F02) - Functional Group Record. Establishes a table of valid functional group codes which relate to detail level J and M Account Codes in AR 37-100-XX.

1. Obtain a copy of the XJU unique file. Find the "J" or "M" functional group codes (position 5 through 9) in the XJU table. List these having a "1" in card column position 70. Does the XJB (F02) file list all those contained in the XJU table?
2. Is there a functional group code for PM material and shop stock material in the XJU table?

C. XJC (F03) - Installation Priority Record. Establishes service order priority days for completion which are used to calculate days backlogged for service orders.

1. How many days are allowed for service order:

- priority 1
- priority 2
- priority 3

D. XJD (F04) - Military Pay Record. Establishes the hourly pay scale for military personnel.

1. Obtain a copy of the current military pay rates from the F&AO. Are the hourly rates listed in positions 20-23 correct?

E. XJE (F05) - Wage Board Benefit Percent Record. Establishes percentages for benefits, including insurance, retirement, FICA, etc., which are applied to cost of jobs for productive labor.

1. Obtain a copy of the current benefit rates from the F&AO. Are the rates correct?

F. XJF (F06) - Prestige Quarters Record. Establishes those facilities for which detailed cost accounting is required.

1. Obtain from housing a list of prestige quarters. Are they listed in the XJE table? Are the suffix codes (column 19) correct? (See Asset Accounting Module Volume 11, pages 3-11).

G. XJG (F07) - Family Housing AMS/APC Record. Establishes account processing codes (APC) to be used in the financial system interface. Established for detailed family housing cost accounts and summary level engineering cost accounts.

1. Is there an entry for at least the following cost accounts?

"J", "K", "L", "M", and "A"

H. XJH (F08) - Error Message Record. Establishes messages to be printed for each error code (FEIMS).

1. Are the error codes entered and are they in accordance with IFS Users Manual, Volume IIA, page IIA-B-59?

I. XJJ (F09) - Family Housing Record. Establishes percentages of work by functional group to be prorated to the different family housing categories.

1. Does a F09 (XJJ) file exist?

J. XJL (F10) - Utilities Operation Record. Establishes percentages of work by functional group to be cost prorated to different reimbursable customers.

K. XJM (F11) - Family Housing AMS Logic Table. Provides for the automatic posting of job costs to the functional group, reimbursable code, Family Housing and General Officer's Prestige Quarters cost reports.

L. XJN (F12) - STANFINS Interface APC Record. Establishes a cross-reference table relating IFS detail level functional group codes to the AR 37-100 XX detail level AMS codes and applicable engineer direct APC codes.

1. Are the correct APC and AMC codes listed? (Ref. AR 37-100-YR)

M. XFU (FR1) - Labor Update. Establishes records with which to compute job and shop cost information.

1. Obtain a copy of the most recent STARCIPS report and the latest GS/WG wage - obtain the current Shop File Report. Are the following correct?
 - shop code
 - normal duty category
 - base rate per hour
2. Are all employees listed correctly?

N. XFV (FS1) - Shop File Update. Establishes and maintains for each shop the criteria by which are calculated shop overhead, PM material, and shop stock cost data.

1. Is the shop overhead rate entered correctly?
2. Is the shop benefit - percent current and correct?
3. Is the computer processing PM and SO shop stock material costs per hour?

O. XFW (FT1) - Equipment Update. Establishes records for each item of Maintenance and Service equipment assigned to the FE directorate.

1. Obtain a listing of all M&S equipment (See AR 420-83) from the Buildings and Grounds Division. Is all the equipment listed?

2. Are equipment rental and depreciation costs IAW AR 415-35?
3. Is transportation motor pool (TMP) equipment listed?

P. XFX (FU1) - Labor Header Update. Establishes the means to calculate COLA and overtime costs and allowances.

1. Is the XFX maximum overhead rate correct:
 - GS
 - WB
2. If cost of living allowance exists, is it correct?

Q. XFY (FV1) - FMJO Update. Establishes the FEMS Master File and provides a percentage for job completion at which special projects and IJO commence being reported.

1. What is the current percent completed for IJOs to print on the special projects report?
2. How many days are required for special projects to be purged?

R. XFZ (FW1) - Task Description/Standard Hours. Establishes a file of standard tasks and standard hours.

1. Check shop performance service orders and PM. Are proper task codes and standard times assigned?

S. XJP (R01) - Facility Mean Time Between Inspection Table. Establishes criteria for the automatic scheduling of facility inspections.

T. XJR (R03) - Facility Condition Percentage Table. Establishes the criteria for the automatic calculations of the relationship between calculated facility condition code and the satisfactory facility condition code C-1 (100%).

U. XJT (R05) - Preventive Maintenance Mean Time Between Inspection Table. Establishes the criteria by which the preventive maintenance inspection schedule is prepared.

V. XJY (R10) - Local Recurring Maintenance Factor Table. Provides the criteria required for the automatic calculation of the Budget and Target year recurring maintenance dollar requirements.

W. XJZ (R11) - Base Data and Analysis Table. Establishes data for the automatic computation of secondary performance factors and for Command Analysis/Tech Data review information for reports to higher headquarters.

X. XJ3 (R12) - Installation Table. Provides a source for retrieval of several installation level data elements required by Assets and RPMA programming.

NOTE 1: Several other uniques currently exist in the IFS but are not in the purview of the installation and are not discussed. These are the XJ2 (R02), XJS (R04), XJU, R07, R08, & XJ4 computer control tables.

Functional Area. Director/Deputy Director/ERMD/MESB/Budget

Reference. IFS Users Manual Volume IIIB Chapter Five (5)

Skill Required. Understanding of How IFS Allocates Labor Costs from K9200 Suspense Account to "STANFIN" AMS Accounts

Summary. Under IFS the salaries of all DEH civilian personnel, except firefighters, are initially charged to the .K9200 account. This includes personnel accounted for under the .P2000 and .N9000 accounts. IFS then spreads the costs to AMS accounts as follows:

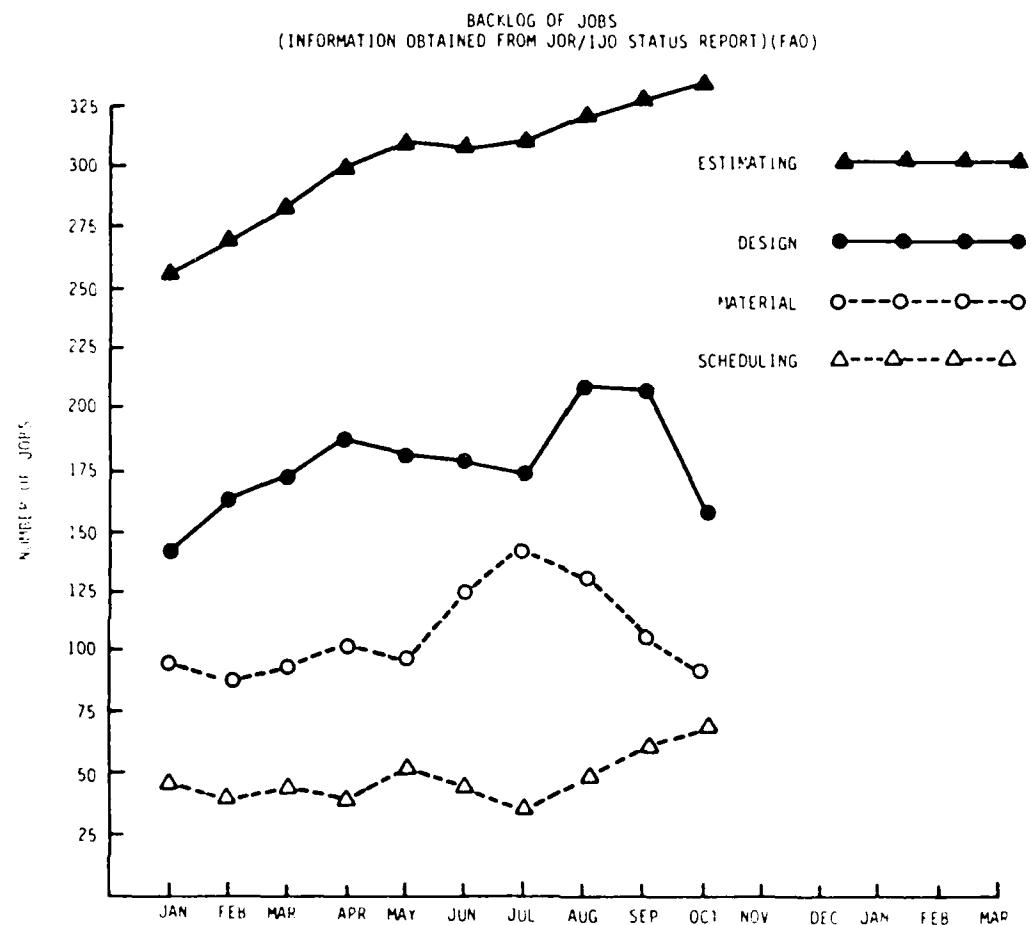
1. Labor rate per hour FRI (XFU) unique table X hours reported on L&E Cards = \$ Amount (Base Rate)
2. Proper Element of Expense is obtained from matching the labor entry code from the XFU to the XJ4 unique table.
3. Overtime is limited by input to the XFX (FU1) table for GS employees. Environmental and hazardous duty pay is based upon the WB10 Step 2 rate via the XFX (FU1) transaction.

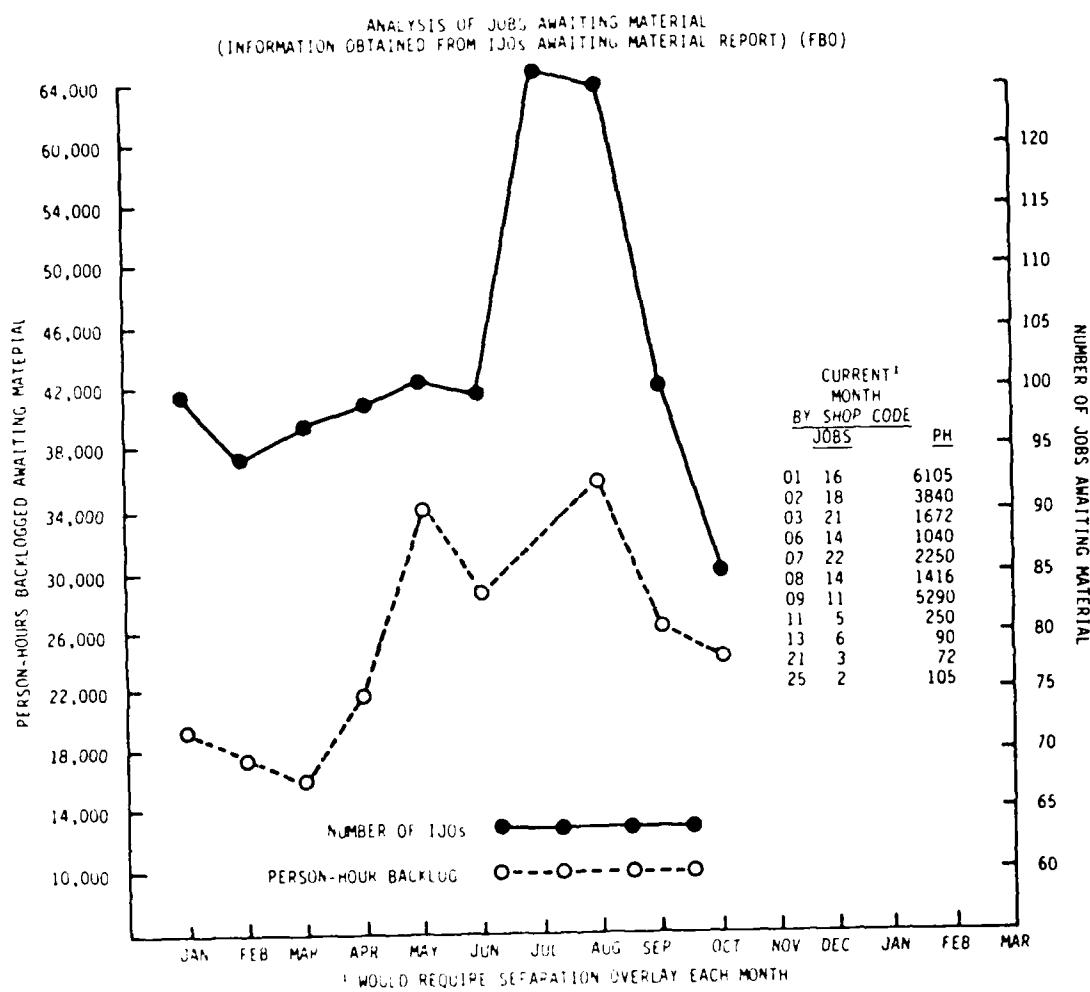
Evaluation Procedures. Was the residual remaining in the .K9200 account greater than plus or minus five percent of last quarter? If it was, MESB/Budget are not following correct operating procedures. The following items should be checked:

1. Does the F&AO civilian payroll have an accurate list of all FE employees?
 - Compare the current "Shop File Report" with the "STARCIPS" interface employee APC listing
2. Are all employees in the .K9200 account submitting L&E cards?
3. Is budget accounting for civilian awards, terminal leave, TDY, etc.
4. Is there a backlog of L&E cards awaiting processing?
5. Monitor the miscellaneous obligation document (MOD) procedures in "STANFINS".
 - Are MODS being reversed out of the .K9200 account?
6. Are base pay rates correct?
7. Check benefit percent figure - should be approximately the same as the sum of the benefit percent figures contained in the F05 (XJE) unique file. Are they correct?

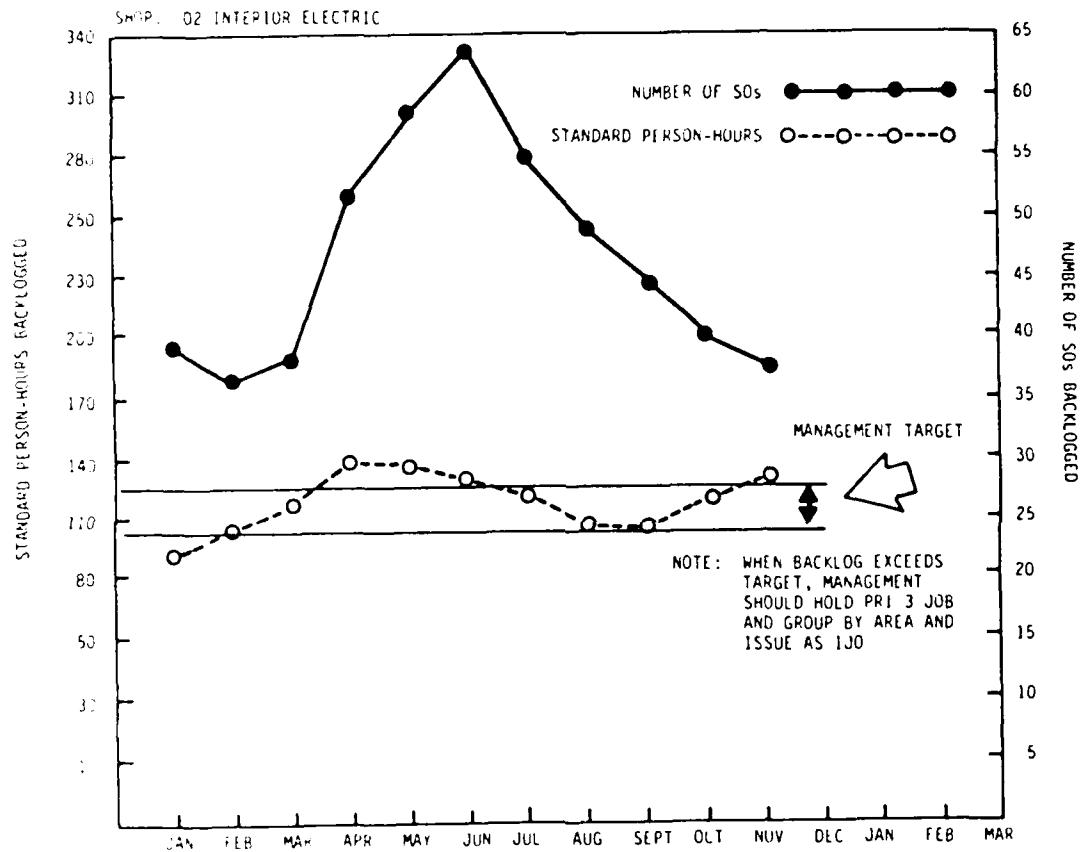
8. Is there a backlog of rejected L&E transactions?
9. Are the STANFINS interface tapes created by IFS (A40AKB) systematically and expeditiously entered into STANFINS?

NOTE: A formal procedure should exist to insure the correct processing of all interface tapes. Failure to process one, or a mistake in the handling of tapes (e.g., processing the same one twice) will have a drastic impact on not only the .K9200 residual, but the IFS distribution of costs as well.

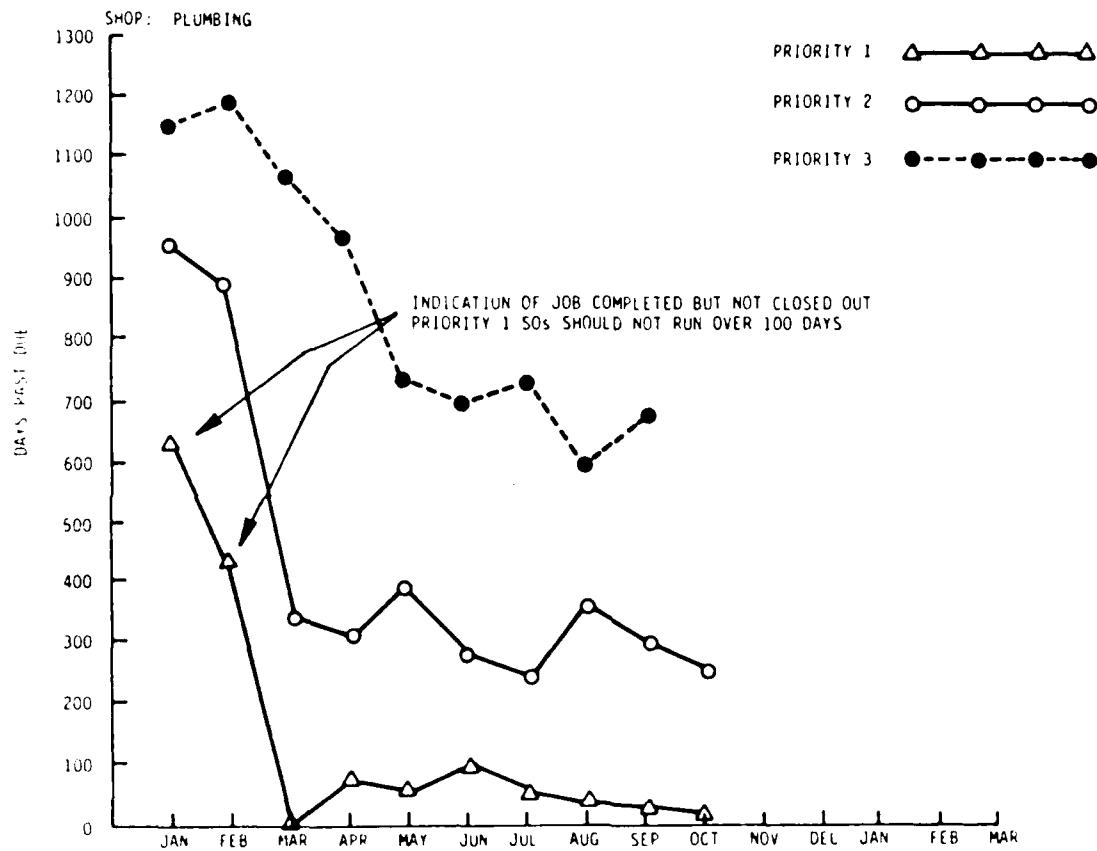




STATUS OF SERVICE ORDER BACKLOG
 INFORMATION OBTAINED FROM SERVICE ORDER BACKLOG REPORT) (FJO)



STATUS OF SERVICE ORDER BACKLOG
DAYS PAST DUE
(INFORMATION OBTAINED FROM SO BACKLOG REPORT)(FJO)



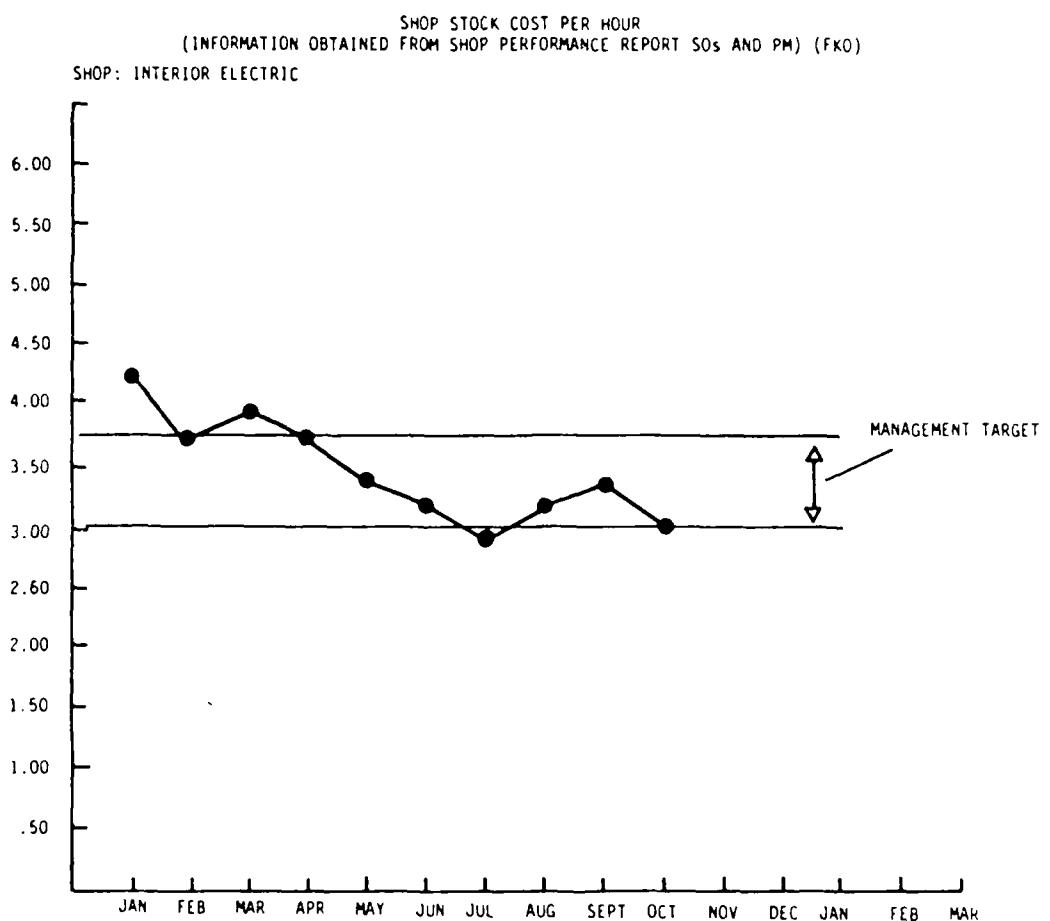
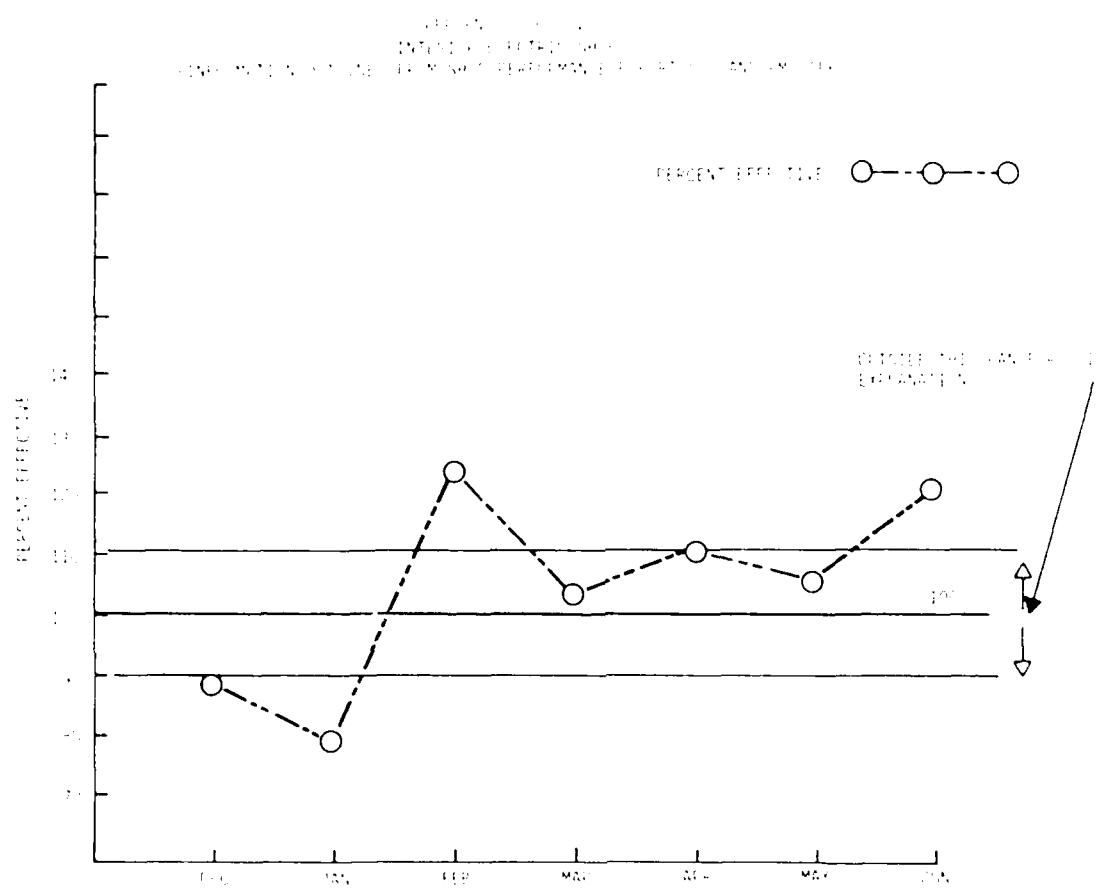
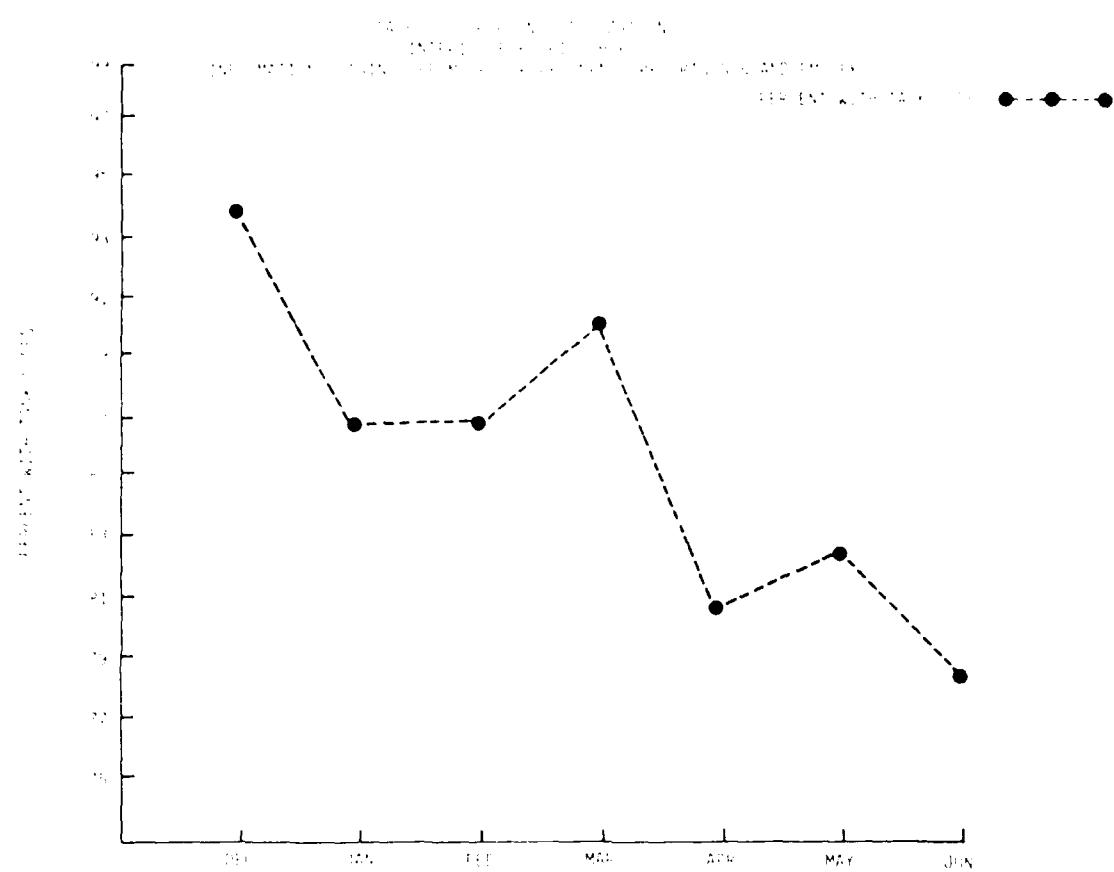
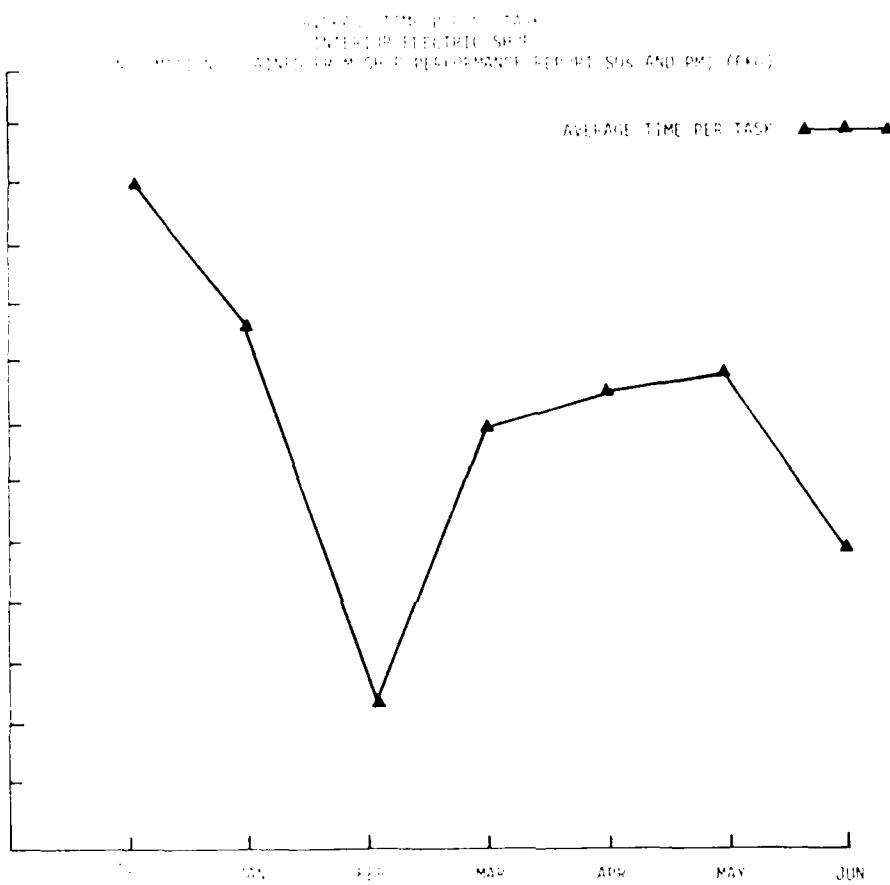
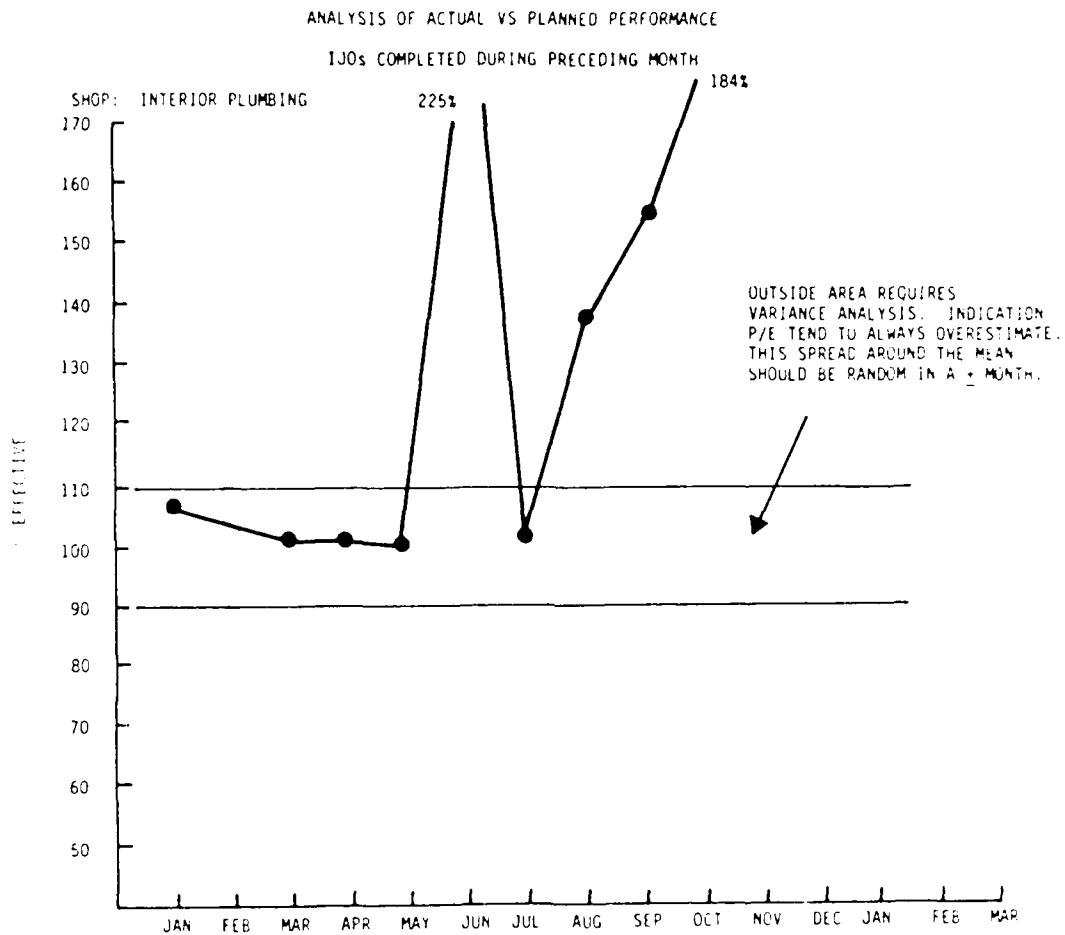


EXHIBIT A-6

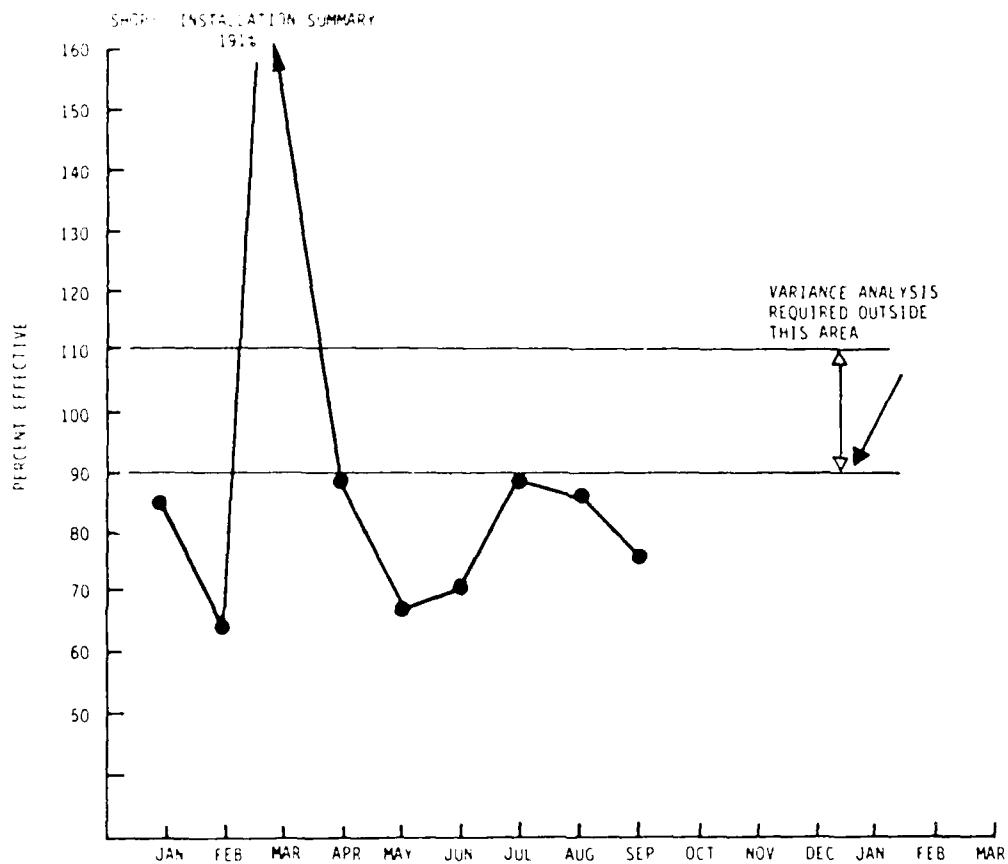


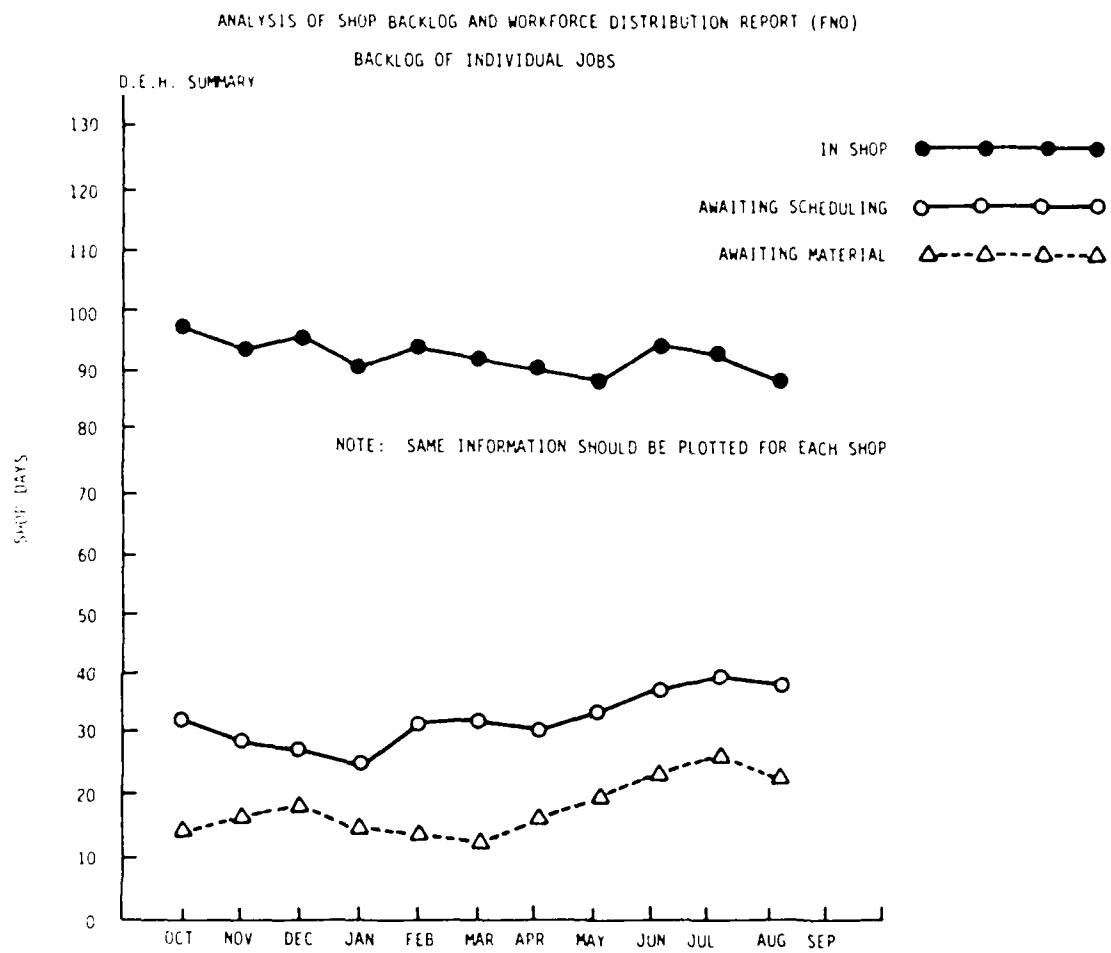


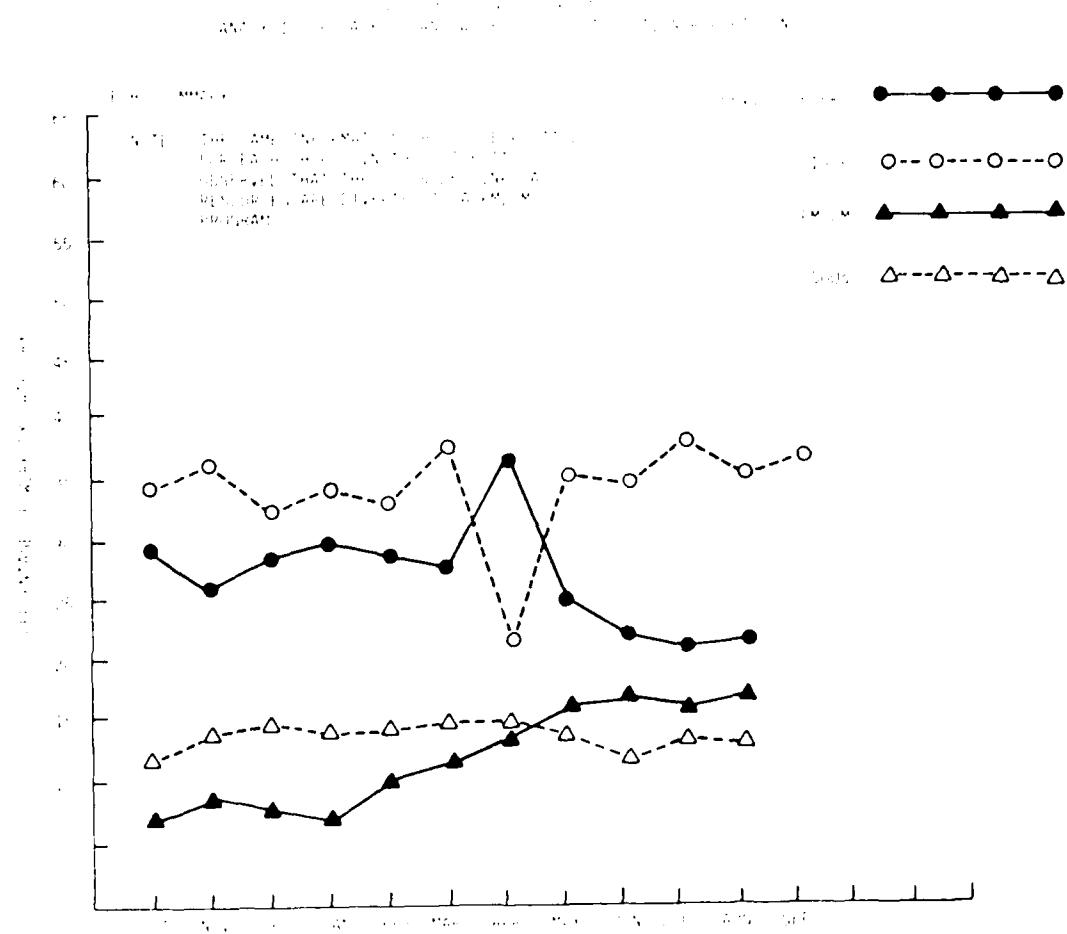


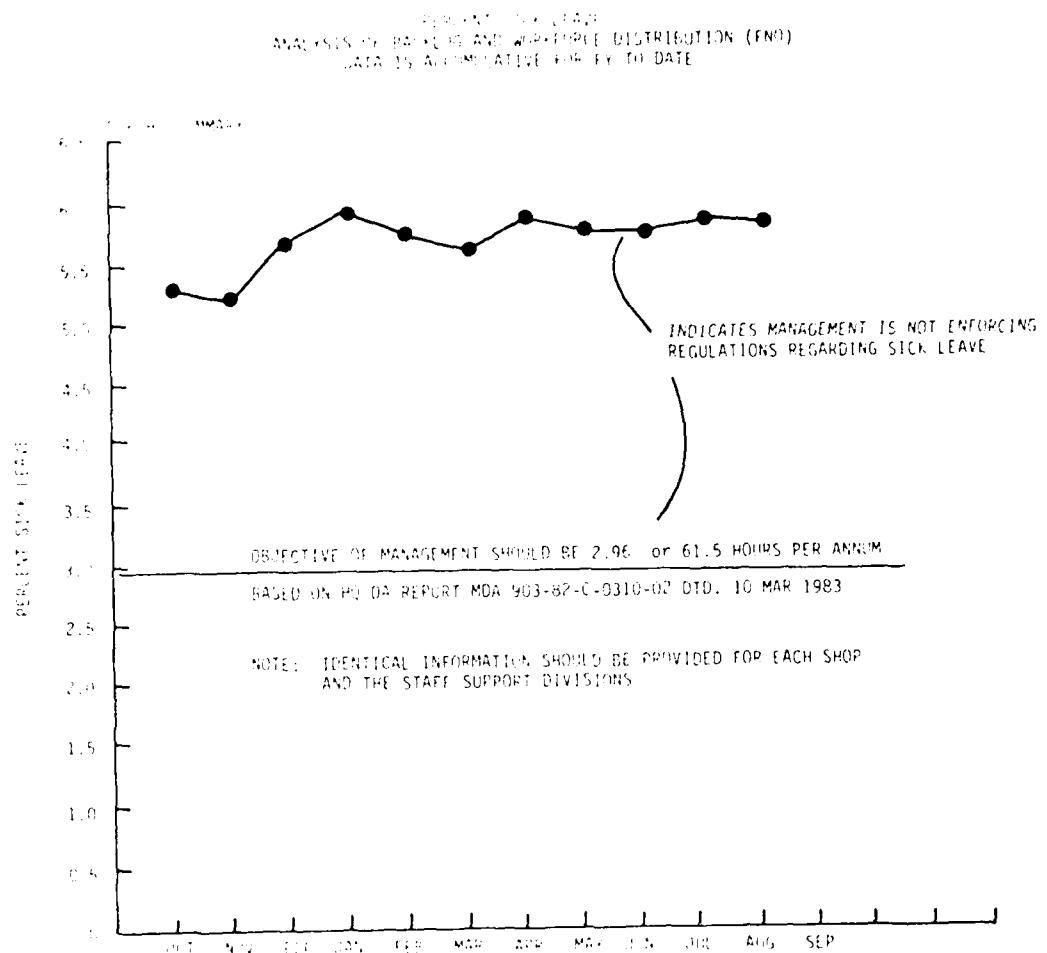


ANALYSIS OF ACTUAL VS PLANNED PERFORMANCE
IJOS COMPLETED DURING PRECEDING MONTH
(INFORMATION OBTAINED FROM SHOP PERFORMANCE ON COMPLETED IJOS) (FLO)

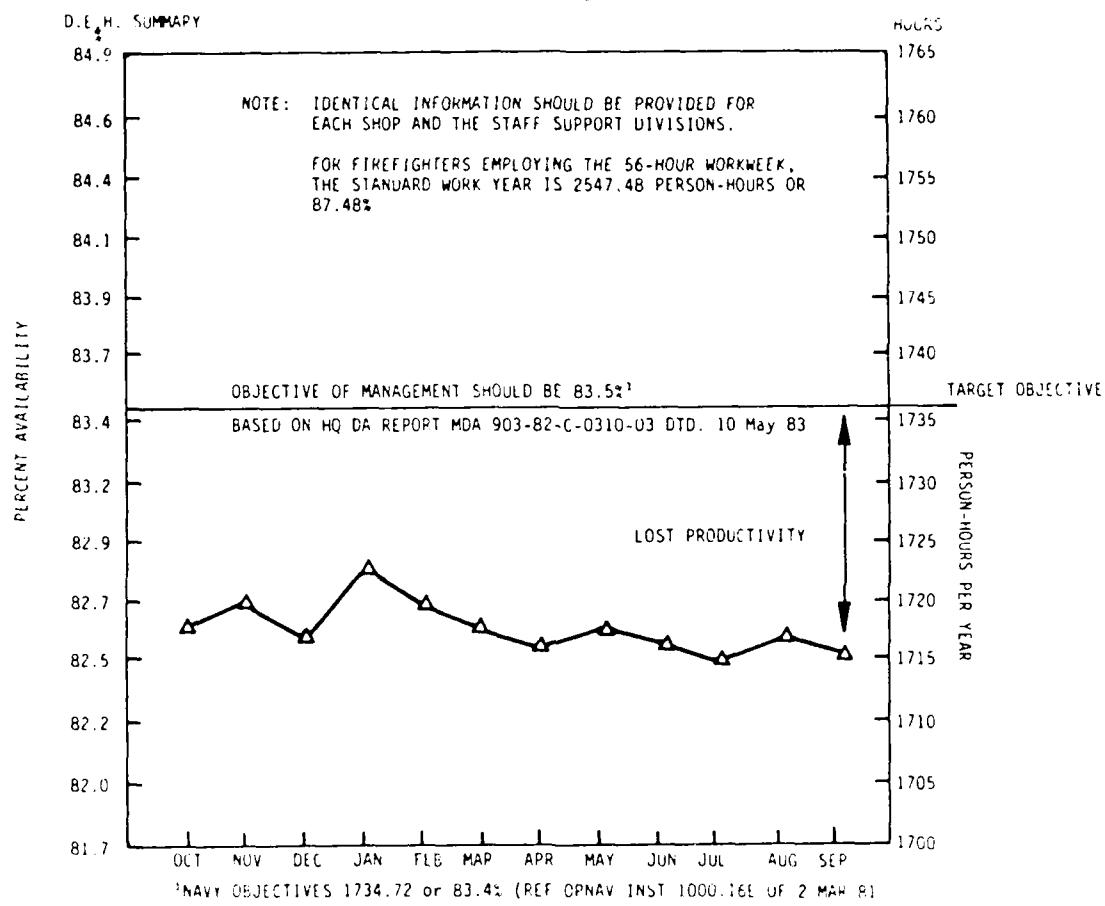


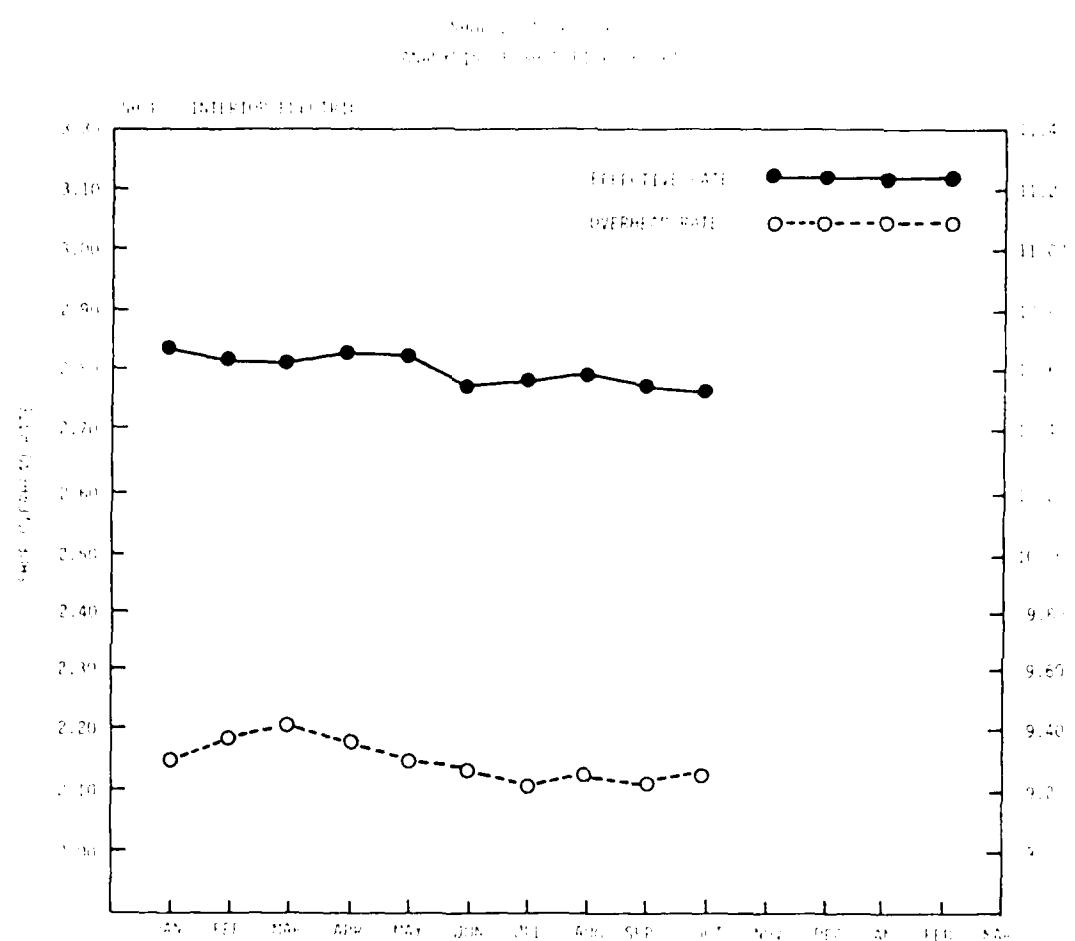


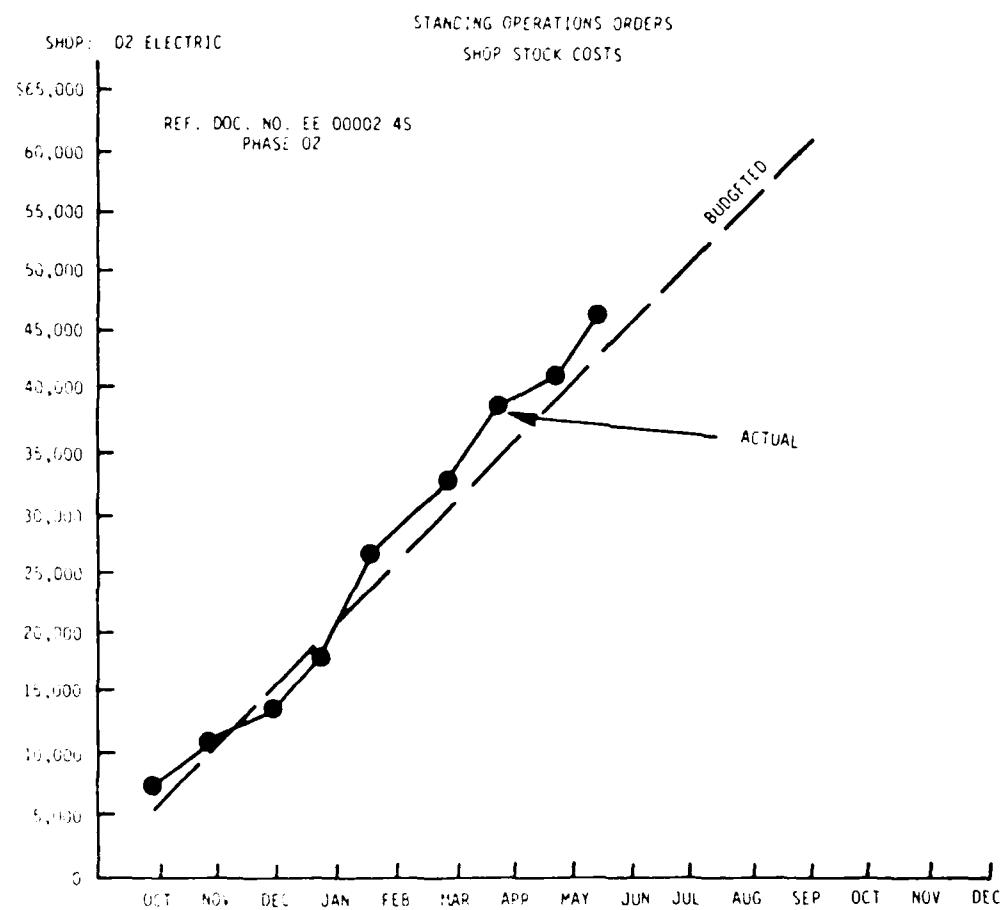


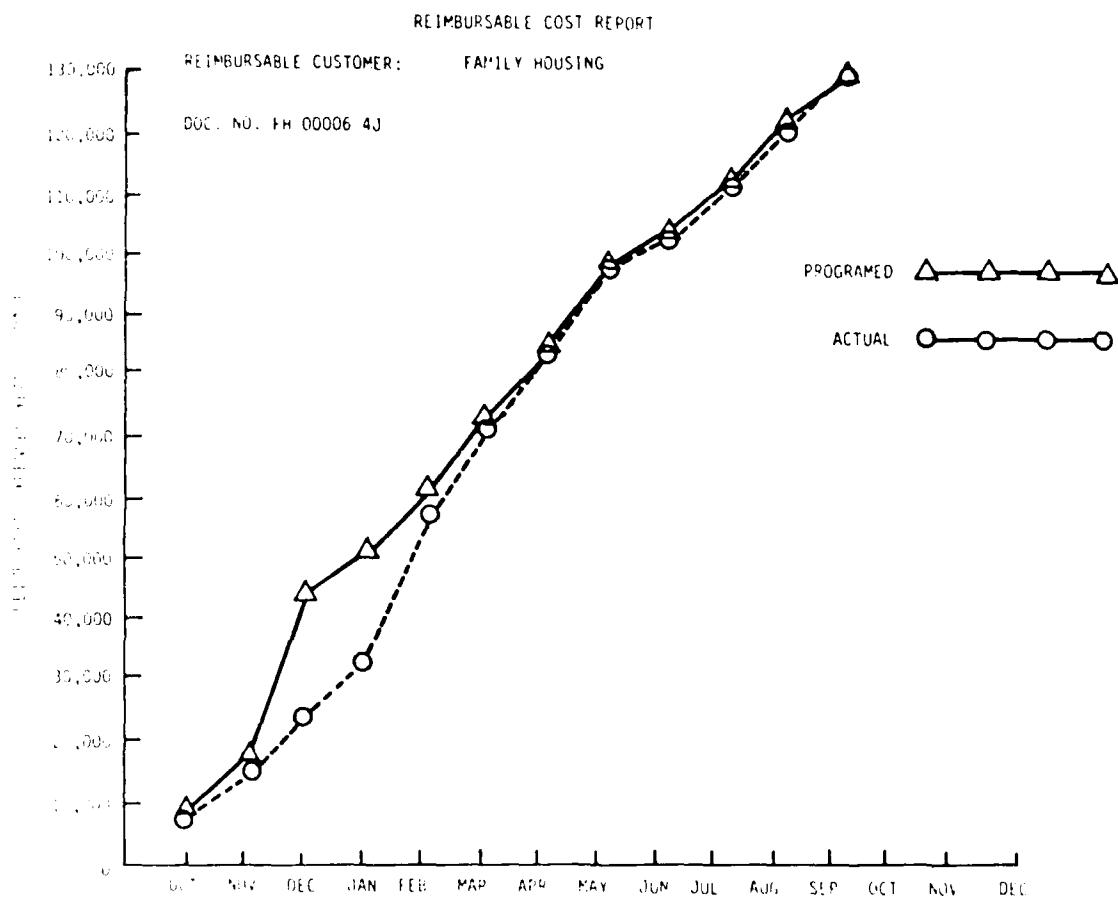


ANALYSIS OF BACKLOG AND WORKFORCE DISTRIBUTION REPORT (END)
WORK FORCE AVAILABILITY









SECTION IV

PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * ENGINEERING PLANS AND SERVICES DIVISION * * *

SECTION IV
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * ENGINEERING PLANS AND SERVICES DIVISION * * *

1.0 SPECIFIC COMMENTS

1.1 The Requirement to Provide Engineering Services for the Director of Engineering and Housing.

A. Finding of Fact. The following functions were discussed are reviewed:

- 16 in-house and 8 A&E project design contracts are administered by the branch. Branch personnel are designated by letter from the Chief EP&S as project managers for each design contract.
- The Deputy DEH and the Chief EP&S are the designated COR and alternate COR respectively for Title I open-end contracts administered at the Military Community for the VIIth Corps area.
- 114 projects for contract services are at procurement. Bids have been taken for 11 of these projects and 22 of these projects have been funded.

B. Conclusions

- The current staffing of the Engineering Services Branch is considered satisfactory to handle the current in-house and A&E design contract workload.
- The use of Title I services is effectively utilized to accomplish the DEH project designs.
- A sufficient backlog of projects exists in the procurement phase, insuring timely obligation of RPMA funds in the community annual program. As funds become available for reprogramming through DA, USAREUR, and VIIth Corps, the projects are "on the shelf" to pursue the reduction of the backlog of maintenance and repair.
- The matters pertaining to design and procurement are well coordinated among all divisions of the DEH and the Schweinfurt/Bad Kissingen Military Community.

C. Recommendations

- Continue use of Title 1 services to maintain a level of designed projects available for contracting thereby taking advantage of potential year end funds which in turn maintains at the present level or reduces the Backlog of Maintenance and Repair.

1.2 The Requirement to Provide Contract Administration and Inspection Services for the Director of Engineering and Housing.

A. Finding of Fact. The following functions were discussed and reviewed:

- The Contracting Officer Representative (COR) is designated by letter from the European Division, Corps of Engineers.
- Inspectors are assigned to all construction projects (28 active and 17 under warranty).
- Contract folders are maintained by the COR.
- Bids for 11 projects have been taken. Total dollar value \$5.6 million (DM).

B. Conclusions

- Review of contract folders revealed that:
 1. Pre-performance conferences are conducted upon the award of the contract.
 2. The daily inspection reports are properly completed regarding all facets of the contract.
 3. Change requests and modifications to the contract are properly documented.
 4. Progress payment certifications are done in a timely manner.
 5. Contracts are accepted using the 1354 document.
- The current staffing of the Contract Administration and Inspection Services Branch is adequate to administer the current and projected construction contract workload for the Schweinfurt/Bad Kissingen Military Community. Reference: DA 570-551 "Staffing Guide for U.S. Army Garrisons".

C. Recommendation

- Continue the present level of effort in the performance of all COR functions for all construction projects at the Community.

1.3 The Requirement to Provide Master Planning and Real Property Services for the Director of Engineering and Housing

A. Findings of Fact. The following functions were discussed and reports were observed as applicable:

- The Community Master Plan was done by A&E Contract. (Phase I-1982 and Phase II-1983).
- 33 Military Construction Projects are programmed up to FY90. Two are under construction, two designs are complete (FY85), and four are under design (FY86).
- New construction requirements are coordinated with the Federal Republic of Germany (F.R.G.).
- Real property records are prepared for facilities.
- The physical inventory inspections of all real property assets are accomplished on the prescribed basis.
- The Installation Planning Board meets on an as required basis.

B. Conclusions

- The Community Master Plan is being properly maintained. The coordination of the Master Plan as it relates to the Annual Work Plan, the Military Construction Program (MCA) and the Backlog of Maintenance and Repair is done on a continuing basis.
- The MCA program is well coordinated through the Installation Planning Board within the Community as it relates to the mission.
- The coordination of new construction requirements with the Federal Republic of Germany (FRG) appears to be functioning satisfactorily.
- The real property records for facilities are being maintained properly. The updating is an ongoing function and new cards are in process of being made to replace old cards. Improvements to facilities are recorded on a timely basis upon receipt of copies of completed work orders. The branch is prepared, with excellent records, for input to the Integrated Facilities System (IFS). (Eng 242 report).
- The triannual physical inventory inspection and annual inspection of troop billets are conducted and recorded accordingly.

- The Master Planning and Real Property Branch is prepared for installation and use of IFS.

C. Recommendation

- Continue the present level of effort relating to the Community Master Plan, Construction Program, and Real Property records.

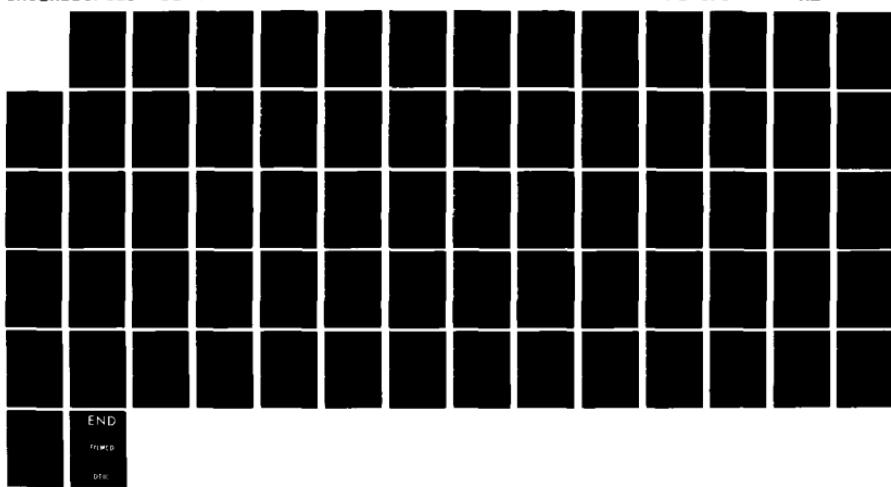
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PRODUCTIVITY REVIEW AND ANALYSIS OF DIRECTORATE OF
ENGINEERING AND HOUSING AT SCHWEINFURT MILITARY
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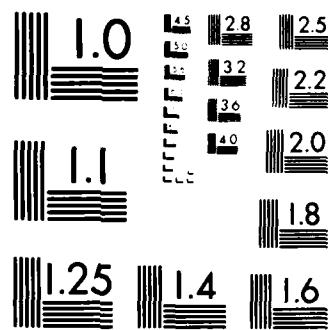
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SECTION V
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * MAINTENANCE DIVISION * * *

SECTION V
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * MAINTENANCE DIVISION * * *

5.1 INTRODUCTION

While the Schweinfurt Military Community DEH organizes its Buildings and Grounds, and its Utilities Divisions into separate entities, results of the work sampling analysis conducted by E. L. HAMM and ASSOCIATES revealed trends which cross these two divisions and are applicable to the workforce as a whole. These trends identify issues which result in instances of lowered productivity at the craft level. This section addresses these trends and also provides recommendations for improvements in procedure and in processing and recording work data. Factual findings and conclusions drawn therefrom will be presented in the body of each sub-section, while recommendations will be held for the end of the sub-section.

5.2 VEHICLE UTILIZATION

Results of the work sampling analysis completed during the initial on-site visit at Schweinfurt indicated that significant problems with service vehicle availability existed. Instances of insufficient material storage space on service vehicles, little or no day-long communication between shop and craftsman, or excessive shared travel to various work sites led to decreased craft productivity. Specific Examples B, C, and D, pages II-58 through II-69, illustrate actual observations of obstacles

to craft productivity resulting from poor or improper vehicle availability. Table V-1 presents the number and type of vehicles currently available to Schweinfurt craftspersons. Table V-1 does not include the total DEH blue-collar work force, but rather those craftspersons who are required, by the nature of assigned tasks to be somewhat mobile. Additionally, the bicycles used by craft personnel at Conn Barracks and Askren Manors are not listed.

TABLE V-1*
 VEHICLE DISTRIBUTION AND MANPOWER STRENGTH
 OF THE
 SCHWEINFURT COMMUNITY DEH
 (INCLUDES SUB-FACILITY BAD KISSINGEN)

<u>SHOPS</u>	<u>2 Doors</u>	<u>4 Doors</u>	<u>VW Golf</u>	<u>VW Caddy</u>	<u>Trk Van</u>	<u>Manpower Strength</u>	
Carpentry	1	1	1	1	0	11	
Metal	2	0	1	0	0	11	
Paint	1	1	0	0	0	9	
Roofers	1	0	0	0	0	3	
Masonry	0	1	0	0	0	7	
Entomology	1	0	0	1	0	3	
PM	1	0	0	0	6	21	
Equip. Maint.	1	0	0	0	0	7	
Electric	2	1	0	0	0	13	
Sanitary	1	0	0	0	0	9	
Refrigeration	1	0	0	0	0	2	
Kitchen	0	1	0	0	0	2	
Pl./Pipefitter	1	2	0	1	0	13	
Heat Equip.	1	0	0	0	0	2	
Fuel Sect.	1	0	0	0	0	1	
TOTAL VEHICLES		33				TOTAL MANPOWER	114

*This table contains non-specialized service vehicles. The Roads and Grounds Shop of 28 craftspersons has been omitted due to their high utilization of specialized service equipment, in order to normalize the analysis of this data.

RATIO: Manpower = $\frac{114}{33}$ = 3.45 or 3:1

As can be seen in Table V-1 above, the disparity of vehicle availability is as diverse as 4 vehicles for 11 persons in the Carpentry Shop to 1 vehicle for 7 workers in the Masonry Shop. More importantly, the ratio of 1 vehicle for every 3 craftspersons reflects the current poor vehicle availability overall. On an average daily basis, 1 vehicle is available to support 3 craftspersons with all the variety of tools, materials, and equipment that each individual may require throughout the day.

Vehicle requirements are a function of workload and should be administered by division management on a daily basis. Utilization of vehicle could be improved through continuing analysis of specific types of work to be performed by each shop such as Individual Job Orders, Service Orders, Scheduled Maintenance and Preventive Maintenance; and the number of craftspersons assigned to these types of work.

FINDINGS OF FACT

Conn Barracks & Askren Manors

During the course of observations taken at Conn Barracks and Askren Manors, an acute vehicle problem emerged, centered around the use of bicycles for transporting personnel and equipment to and from job sites. Several times during the work sampling period, workers were observed spending excessive travel time associated with the vehicles' inability to carry or store all necessary tools and equipment for a particular day's work.

Vehicles at Conn Barracks and Askren Manors are insufficient to satisfy the needs of the worker and the job. Vehicles employed for work consist of bicycles with small baskets attached to the front. The basket

area measures approximately 6" deep x 30" long x 24" wide. This carrying capacity presents many problems for accomplishing work.

- Basket Is Not Deep Enough. As cited in Example C of Section II, certain equipment will not fit comfortably in the basket. A commode, carried along or with other equipment, has a tendency to be unstable on such a vehicle.
- Basket Is Not Wide or Long Enough. The size disadvantage becomes a significant problem when a need to carry sections of pipe arises. Workers often resort to alternate means for carrying this pipe, which ultimately leads to unsafe transportation practices.
- Baskets Are Not Lockable. Whenever workmen carry tools and equipment with them in their basket, they must remove all equipment and tools from the basket at every job site, whether needed or not, for fear of being stolen. This practice results in unnecessary time and effort being expended in removing all tools and equipment at every site.
- Baskets of Needed Size Are Too Big for Bicycles. As described above, the current baskets attached to bicycles used for travel are inadequate. However, if appropriate-sized baskets (deeper, wider, longer, lockable) replaced current baskets, the weight of such a load would result in wasted travel time. A fully loaded larger basket would force the worker using the vehicle to push, rather than ride, that bicycle. The extra weight and resulting lack of maneuverability caused by a larger basket would be counter-productive and unsafe.
- Current Vehicles Are in Poor Condition. A survey of existing bicycles revealed that most vehicles used by workers are in poor condition. Many of the bicycles appear to be over 25 years old. Vehicles in such condition have a high frequency of breakdowns. Quite a few bicycles do not have any baskets or carrying capacity. Time spent by craftsmen repairing or returning broken vehicles is time that could be spent more productively.

Bad Kissingen

The work sampling analysis conducted at the Bad Kissingen sub-facility revealed similar service transportation problems. Example B in Exhibit II-A-7, page II-58, typifies craft transportation at this facility. Craftspersons at Bad Kissingen do have available service vehicles in the form of trucks, yet the lack of sufficient numbers of

vehicles forces some craftspersons (especially those working on service orders) to walk to independent job sites. All tools, materials, and equipment must be hand carried from shop to job site. Should repetitive shop trips occur due to unanticipated material or tool requirements, a great deal of craft time is lost to foot travel.

CONCLUSION

There are several disadvantages associated with the use of bicycles as primary transportation for workers. Carrying capacities are small, lockable storage is not available, and the bicycles are in poor condition -- all factors contribute to the reduction of potential craft productive time. Craftspersons who are forced to walk to each job site lost time in slow travel, but are also ill-prepared with adequate tools and materials which may arise throughout a day's work activity. Improved vehicular support is essential to improved productivity. Transportation to and from work centers or sub-stations, as well as transportation between individual job sites is as directly influential on productivity as having the proper wrench or socket to fit a bolt.

RECOMMENDATIONS

In light of the findings of fact and conclusion presented above, the following recommendation is made:

(a) Utilize small three or four-wheel gasoline-powered vehicles for service order completion at Conn Barracks, Askren Manors, and Bad Kissingen.

(1) Unnecessary travel caused by small carrying capacities is eliminated. As illustrated by Example C in Exhibit II-A-7, page II-62, several minutes of craft time each day is spent returning to the shops

for material which the bicycles cannot accommodate. Repetitive shop trips would be eliminated since the carrying capacity (including lockable storage) of these gasoline-powered vehicles would be more than enough to carry virtually all tools, materials and equipment for a day's work.

(2) Unnecessary travel associated with the lack of lockable storage would be eliminated. Many times, workers sent on service orders required extra trips to the shop for materials not normally carried. Golf cart-type vehicles would allow craftspersons to carry with them at all times a full range of material to cover most all jobs. The lockable capability would enable craftspersons to keep the material with him until needed, eliminating that unnecessary travel.

(3) Parking space is not affected. Parking space (especially at Conn Barracks) is not abundant. Golf-cart type vehicles require a little more space than a bicycle. The introduction of such vehicles into the work force would have little impact on parking space availability.

(4) More conducive to radio dispatching. As indicated by the Documentation for Productivity Capital Investment Programs for a radio communication system, Schweinfurt Military Community is making a commitment to radio dispatching. It is recognized that such dispatching will have a positive impact on productivity. Due to the larger carrying capacity and lockable storage available on golf cart type vehicles, these vehicles will be more conducive to radio dispatching. With the capability to carry more material, tools and equipment, golf cart type vehicles would be able to respond to radio dispatching without requiring additional travel back to the shop.

To quantify the advantages associated with the recommendation to replace bicycles with golf cart-type vehicles, detailed information is presented in Exhibit V-A, page V-26. This exhibit illustrates expected expenses associated with the purchase of golf cart-type vehicles. These expenses are then expressed in personhours in an effort to demonstrate the payback period.

As shown in Exhibit V-A, page V-26, approximate savings of 25.6 minutes a day per workers are needed to justify the purchase of 3-wheel gasoline vehicles solely on a break-even basis. As mentioned earlier, time savings associated with the purchase of such vehicles include reduced trips back to the shop for oversized materials, reduced trips back to the shop for specialized, low-usage supplies, reduced travel attributed to pushing bicycles with oversized loads, and unnecessary trips back to the shops for lunch each day. While singularly such time savings account for 5-8 minutes each, aggregate they approach 25 minutes in total.

There are two other points that need to be discussed in relation to the purchase of 3-wheel vehicle. First, modifications aimed at satisfying individual or shop needs may be made to the cart-type vehicles on an as-needed basis. Modifications may include enclosed cabs, special storage cabinets, or acetylene torch and welding capabilities. The second point involves the security of the motorized carts. Again, several options exist. A limited number of carts may be stored overnight in the same location used to store bicycles (e.g. Steam Fitting Shop at Conn Barracks). Sufficient space outside of the shop building may be made acceptable for securing the motorized carts. For example, at Conn Barracks all gates and posts for fencing around Building 73 are already

in place. Completion of the fencing, including padlocks for the gates, would provide secure storage for the service carts. Plastic covers may be provided to protect the cart type vehicles during inclement weather.

In conclusion, lack of sufficient vehicles at Conn Barracks and Askren Manors has been demonstrated. This lack of vehicles limits the productive capacity of the craftspersons at the Schweinfurt Military Community. Recommendations have been made for the purchase of 3-wheel vehicles in an effort to increase the productive capacity of craftspersons. The break-even point for vehicles is a 25 minute increase per day in total productivity. Additional considerations for these vehicles include customizing vehicles to specific needs and the securing of vehicles during nonworking hours.

FINDINGS OF FACT

Organizational Maintenance

Often, vehicles are removed from service to perform scheduled maintenance on them. Whatever downtime resulting from such scheduled maintenance only further emphasizes the vehicle availability problem. The organizational maintenance shop of the Schweinfurt DEH is responsible for completing all scheduled and preventive maintenance on service vehicles.

Table V-2 presents the average approximate turnaround times for both the organizational maintenance shop of the Schweinfurt DEH and TMP-5 of the Schweinfurt Directorate of Industrial Operations. Table V-2 also presents the observed productivity findings of the DEH organizational maintenance shop.

CONCLUSION

For each craftsman, 1686 person-hours are available annually for productive purposes. Service vehicles are utilized solely during those 1686 craft hours. The excess of 22 person-hours for lubrication maintenance (see Table V-2) represents 1.3% of that service vehicle's available utility spent in a maintenance shop due to craft inefficiency.

TABLE V-2
TURNAROUND TIMES

	<u>LUBRICATE AND CHANGE OIL (PERSON-HOURS)</u>	<u>SEMI- ANNUAL INSPECTION (PERSON-HOURS)</u>	<u>ANNUAL INSPECTION (PERSON-HOURS)</u>
Organizational Maintenance	6	16	16
DIO-TMP 5	.5	16	<u>16-24</u>
Difference	5.5	0	0 to -8
Frequency of Task Annually	4	1	1
Person Hours Vehicle is Non-Available due to Excessive Organizational Maintenance			
Turnaround	22	0	0

PRODUCTIVITY

ORGANIZATIONAL MAINTENANCE

<u>DIRECT</u>	<u>INDIRECT</u>	<u>NON-PRODUCTIVE</u>
66.8	19.3	13.9

Turnaround times are compared between similar service vehicles employed and maintained by both the DEH and TMP 5. Additionally, services schedules and maintenance procedures for these vehicles were compared to insure similarity between the two service/maintenance shops.

While the direct productivity of the Organizational Maintenance Shop is high (66.8%) relative to the overall Schweinfurt figure, the non-productive percentage (13.9) is also high. In-shop activities like organizational maintenance normally have extremely high productive rates and relatively low non-productive rates, simply due to the minimal craft travel required by the assigned tasks.

RECOMMENDATION

In order to more quickly return service vehicles to operation, the Organizational Maintenance Shop should strive to reduce the turnaround time for simple lubrication maintenance.

No significant problems with vehicular maintenance support were observed during work sampling at the Schweinfurt Military Community. The high level of productivity and relatively comparable maintenance turnaround times indicate that Schweinfurt DEH service vehicles are serviced and maintained quickly and productively during annual and semi-annual inspections. Improvements in lubrication maintenance time would help to reduce down and turnaround times at the Schweinfurt DEH. Suggest Organizational Maintenance visit and observe the DIO operation.

FINDINGS OF FACT

Administrative Vehicle Utilization

Lack of proper management of vehicle use not only hinders craft productivity but also affects the administrative and supervisory function of Schweinfurt's DEH. Division administrative personnel have little access to DEH service vehicles. Division inspectors are required to use their own vehicles in the performance of their tasks.

DEH employees who must use their personally owned vehicles (POVs) for official business are reimbursed for their travel. Reimbursement is based on mileage at DM .36/kilometer. Using a DM 2.80:\$1 conversion rate, the reimbursement approxiamtes \$.08/mile.

Table V-3 presents the vehicle types and numbers which were made available solely for DEH Adminsittrative purposes during the on-site visits by E. L. HAMM & ASSOCIATES. Additionally, Table V-3 shows the costs incurred by leasing vehicles for administrative use. Spot checks during on-site visits revealed that 3 to 5 of the vehicles listed in Table V-3 were parked and idle at any one time.

CONCLUSION

The mileage reimbursement rate of \$.08/mile is insufficient to cover the gasoline and operational costs of utilizing POVs for official business. This point is especially acute in a nation where gasoline costs exceed \$1.40 per gallon. While the financial aspect of POV use is important, E. L. HAMM AND ASSOCIATES maintains that the detrimental effect on morale is as significant, if not more significant, as the monetary concern. Requiring the use of an administrative employee's POV in the performance of an assigned task is analogous to requiring each craftsperson to provide a service vehicle for craft use.

TABLE V-3

SCHWEINFURT DEH
ADMINISTRATIVE VEHICLE AVAILABILITY

<u>VEHICLE TYPE</u>	<u>QUANTITY</u>	<u>ADMIN. ASSIGNMENT</u>	<u>COMMENTS</u>
Sedan	1	Director-DEH	Assigned recurring use from TMP 5
Carryall	2	EPS	Assigned recurring use from TMP 5
Carryall	1	ERMD	Assigned recurring use from TMP 5
Carryall	1	B&G Division	Recurring use from TMP 5 Reassigned by B&G Chief to Roads Shop
Carryall	1	Fire	Assigned recurring use from TMP 5
Panel Truck	1	EPS	Assigned recurring use from TMP 5
Jeep	1	Utilities Division	Recurring use from TMP 5 Reassigned by Utilities Chief to Sanitation
Sedan	1	Housing Referral	Long-term lease - Expires April, 1985
Carryall	3	Housing Referral	Long-term lease - Expires August, 1985
Carryall	<u>2</u>	Housing Referral	Short-term lease - Expires Sept. 1984
	14		

-- All recurring use vehicles remain at the DEH and are allocated on a daily basis for DEH use by TMP 5.

-- Vehicle leasing is handled by TMP 5. Lease costs are shown below:

<u>Type</u>	<u>Lease Dates</u>	<u>Costs</u>
(1) Sedan	June 30, 1984 - April 30, 1985	DM 5,400.00 - \$ 1,928.57
(2) Carryall	Sept 15, 1983 - Aug 31, 1984	DM 40,365.00 - 14,416.07
(3) Carryall	July 25, 1984 - Sept 21, 1984	DM 2,046.49 - 730.89
TOTAL LEASING		\$17,075.53

*Conversion Rate of DM 2.8:\$1

Table V-3 shows the large number and wide variety of vehicles available for DEH administrative use. Complaints of poor availability and the fact that administrative personnel regularly use POVs in the performance of their duties indicates that misallocation and poor organization has led to a problem in administrative vehicle utilization.

RECOMMENDATION

The creation of an administrative DEH motor pool, including those vehicles listed in Table V-3 and administered by the Organizational Maintenance Shop will reduce or eliminate the use of POVs and alleviate the administrative vehicle crunch. Pooling all motor vehicle resources and utilizing effective communication and scheduling methods would provide administrative personnel with required vehicles. A priority-request system can be established to provide vehicles according to task immediacy. Weekly or bi-weekly schedules could be coordinated among divisions. The Schweinfurt DEH maintains the sufficient resources for administrative use, but lacks the vehicle administration to use them.

5.3 SELF-HELP WORK

FINDINGS OF FACT

During the observation period for the productivity review, approximately 50% of the observed workers were performing service order or preventive maintenance type work in bachelor and family housing. The succeeding findings follow from those observations.

- Craftspersons perform work that is specified as self-help. In over 50% of the instances, craftspersons were observed performing work considered to be self-help in nature. Normally, such work includes replacing switch plates, fluorescent tubes, light bulbs, and faucets, clearing urinals, and floor drains, and tightening or repairing door hinges, door stops, and other bathroom accessories.

- Work Reception is not cognizant of self-help program. A large number of the service orders coming from work reception were for self-help work. Much of the work reported to work reception was vague. For example, a tenant in the barracks would report that a light was not working. The service order was then written as a broken light. A craftsperson arriving at the site would find that a fluorescent tube needed replacing.
- Craftspersons are not cognizant of self-help program. Following with the above example, craftsperson arriving at the job site finding self-help work would replace, repair as necessary. It became very apparent after conversations with workmen that the practice of performing self-help work was very common. No attempt was made by the worker to inform the tenant that such work was self-help.
- Tenants are not cognizant of self-help program. In addition to service order work, a sizeable amount of the work performed by the preventive maintenance team was considered self-help. When preventive maintenance craftspersons enter a family housing unit, the tenant is asked what items need to be repaired. Rather than selecting only that work which is outside of the self-help program, the tenant suggests work that is predominantly self-help.

Further examples of craftspersons performing self-help work are presented in Exhibit II-A-7, page II-56, Examples A through O of Section II.

CONCLUSION

A large amount of the work performed by craftspersons through service orders and preventive maintenance teams is self-help. This is due to the fact that most of the workforce and tenants are not aware of the self-help program. Time spent by workers performing self-help work reduces the productive capacity of the DEH workforce. If self-help work was not performed by DEH craftspersons, more IJO or non-self help work could be accomplished.

RECOMMENDATION

To correct the situation described in the findings of fact and increase the productive capacity of the DEH workforce, a formal self-help

training program should be initiated in accordance with the local standing operating procedure for the self-help program and AR 420-22, USAREUR Pam 420-1, TB ENG 402, DA Pam 210-2 and DA Pam 420-6. To ensure the success of such a program, the DEH workforce should be aware of the responsibilities of the housing and barracks' occupants under the self-help program. The DEH workforce would then be able to refuse requests for work that is included in the program. There are three distinct advantages to the proper implementation of a self-help program:

- DEH workforce can become more productive. Once workers stop performing self help work, they are able to concentrate their productive work effort on more important work. In total, this should reduce the BMAR by freeing workers from self-help work.
- Facilities will be maintained better. Once tenants are well versed in self-help work, they will become more aware of their surroundings. Work normally left for the preventive maintenance teams or called in on service orders will be performed by tenants soon after it is noticed, reducing the chance of a unit deteriorating due to neglect. Additionally, craftspersons will be spending more time on craft work, again reducing the chance of a facility deteriorating.
- Cost Avoidance Can Be Achieved. 50% of observed service order work and 50% of all observed preventive maintenance work was self-help in nature. If that craft time was applied toward service work requiring skilled labor, wasted craft skill would be redirected to more critical service work. The annual cost avoidance attributable to elimination of self help work is \$176,664 (See Table V-4).

TABLE V-4
 COMPUTATION OF COST AVOIDANCE
 FOR
 ELIMINATION OF SELF HELP WORK
 FROM SERVICE ORDERS
 (SCHWEINFURT AND BAD KISSINGEN)

<u>SHOP</u>	<u>CRAFT HOURS SPENT ON SERVICE WORK</u>			<u>TOTAL FIRST 3 Quarters 1984</u>
	<u>Quarter 1 1984</u>	<u>Quarter 2 1984</u>	<u>Quarter 3 1984</u>	
Carpentry	1,384.75	1,485.75	1,506.25	4,436.75
ACR/Kitchen	336.50	402.50	444.00	1,183.00
Plumbing	2,591.50	2,923.75	2,554.50	8,069.75
Electrical	2,767.00	2,776.50	2,771.00	8,314.50
Paint	987.00	801.00	700.25	2,548.25
			GRAND TOTAL	24,552.25

Projection for Quarter 4, 1984:

Using Moving Average of Most Recent 3 Quarters:

$24552.25/3 = 8184.08$ Average Craft Hours per Quarter =
 Projection for Quarter 4

Projected Annual Craft Time Spent on Service Orders:

$8,184.08 \times 4 = 32,736.32 \times .50$ (Self Help) = 16,368.16 hrs.
 spent on self-help work annually

PM TEAM*

22 Craftspersons \times 1586 hours available annually = 37,092 total available craft hours

$37092 \times .50$ (self help) = 18546 hrs spent on self help work annually

Cost Avoidance

16368.16 Annual Self Help Hours (Carp, Plumb, ACR, Elect, Paint)

18546.00 Annual Self Help Hours (PM)

34914.16 Total Annual Self Help Hours

$34914 \text{ hours} \times \5.06 annualized unburdened wage rate = \$176,664

*50% of all observed preventive maintenance work was self help in nature.

NOTE: These calculations consider the observed percentage of self-help work performed by only six shops (Carpentry, Plumbing, Paint, Electric, ACR/Kitchen, PM) and do not consider cost avoidance possibilities in other DEH shops due to self help work.

All in all, the implementation of a self-help program at the Schweinfurt Military Community will enable workers to perform more productive work and increase the level of maintenance of the facilities. With such benefits resulting from a self-help program, it is strongly recommended that attendance by tenants be mandatory. Section VI addresses specifically a Self-Help Training Program.

5.4 SERVICE ORDER COMPLETION TIMES

FINDINGS OF FACT

During a three-week observation period, data concerning service order manhours was collected. In regard to this data, the following findings of fact were made.

- Average personhours for completed service orders is 2.26 personhours. According to the consolidation of Sos for the first three quarters of FY84, approximately 14,023 service orders were completed by all shops at the Schweinfurt Military Community. Total personhours associated with these completed service orders was 31,640 personhours. The overall average personhours for completed service orders is 2.26 personhours ($31,640/14,023$). The figure is verified by the Evaluation of In-House Workload, dated 9 April 1984 (overall average = 2.2) and the Month Report on the backlog of Sos (overall average = 2.3).
- Average personhours to complete service orders during the observation period is 0.97 personhours. During the on-site observation of workforce personnel, data related to service orders was gathered. Observers collecting productivity information also recorded service orders worked on, the SO number, and time needed to complete the service order. One hundred service order were examined. Total time to complete the service orders was 97.2 personhours. The average time to complete observed service orders was 0.97 personhours or 58 minutes.
- Average number of service orders completed per day is 5.3. During the observation period, 19 persondays were spent observing workers accomplishing service order tasks. For these 19 days, 100 service orders were completed. The average number of observed service orders completed per day is 5.3 service orders.

Exhibits V-B, V-C and V-D, pages V-27 through V-29, graphically illustrate the discrepancies between the reported service order completion times and the observed service order completion times. In Exhibit V-B, page V-27, all observed service orders are grouped according to the observed completion times. For example, the first bar shows that 38 service orders were completed between 6 and 34 minutes. The second bar shows that 30 service orders were completed between 35 and 59 minutes. According to data provided by ERMD, the DEH average service order completion time is 2.25 personhours or 135 minutes. Of the 100 observed service orders, only 6 service orders required 135 minutes (DEH average) or more to be completed. Ninety-four service orders were completed in less than 135 minutes.

Exhibits V-C, V-D, pages V-28 and V-29, show service order completion times by shops. In Exhibit V-C, page V-28, each observed shop service order completion average is shown, contrasting with the DEH average of 135 minutes and the average of all observed service orders of 58 minutes. The Kitchen/Refrigeration shop had the highest average observed service order completion time, while the Electrical Shop had the smallest average time. Exhibit V-D, page V-29, compares the reported average for service orders with the observed average for service orders. In all cases, the observed average is much less than the reported average.

CONCLUSION

In accordance with the findings of fact, service orders during the observation period were completed on the average in less time than those service orders for the last three quarters of FY84. Two possible factors contribute to this situation:

(a) Craftspersons actually completed service orders faster than normal. This occurrence may be due to changes in service order work (seasonal) and/or a change in craftspersons work time caused by the Hawthorne effect. (The Hawthorne effect is a term used to describe changes in a worker's work patterns because he/she is being studied or observed by outsiders.)

(b) Reported time to complete service orders varies from the time actually (observed) expended by craftspersons. While on-site, several completed observed service orders were researched to identify the reported time. In 75% of the cases, the reported time was greater than the actual (observed) time for the SO completion. These SOs were overstated an average of 46 minutes. In 25% of the cases, the reported time was less than the actual (observed) time for SO completion. These SOs were understated an average of 29 minutes. It also became apparent that workers report SO completion times in increments of 30 minutes (30, 60, 90, etc.). Workers are not recording workload data accurately, which indicates that they are not properly trained in the procedures needed to complete labor cards.

RECOMMENDATION

In light of the findings of fact and conclusions presented above, the following recommendation is made:

Service Orders should be more closely monitored. Such monitorings should pay particular attention to the completion times of service orders. It is extremely important that information concerning service orders (and other work orders) be reported as accurately as possible. This monitoring, and any required training, should be performed by the shop foreman. Through on-site (field) investigation, the supervisor would be able to ascertain completion time for craftspersons. This may then be compared to reported times in order to identify deviations. This practice would lead to several advantages:

- More useful information is available. With the introduction of IFS, many different reports for monitoring and controlling work will be available. The usefulness of such data is highly dependent on the accuracy of the input data. By monitoring service orders closely, IFS reports may be relied upon, assisting managers in their tasks. (Additionally, IFS requires SO completion time to be reported in increments of six minutes, not 30.)
- SO backlog could be reduced. If discrepancies between actual and reported SO completion times are identified, corrected information would enable better analysis of workload standards. With revised standards, a reevaluation of SOs would result in an overall reduction in the backlog of service orders.
- Cost avoidance can be achieved. The observed Service Order average (58 minutes) is 77 minutes less than the reported Service Order average (135 minutes). After three weeks of work sampling it cannot be stated nor implied that the 77 minutes over the observed time is wasted time. What can be said, however, is if this 77 minutes is applied to other jobs and not to the current charged SOs, a total cost avoidance for SOs of \$120,133 (18,500 SOs x 77 minutes/60 x \$5.06 unburdened wage rate = \$120,132.83) is possible.

5.5 SAFETY

The observation of safety precautions and usage of safety protective equipment is necessary to insure the physical well-being of the craftsperson as well as continued productivity.

FINDINGS OF FACT

During the work sampling phase of this study, several instances of dangerous or careless activity on the part of craftspersons were observed. Electricians and PM team members were observed replacing switches, fixtures and sockets while electric current still ran "hot" through the wires. Pipefitters and metal workers were observed cutting with torches or using grinding equipment without the use of safety goggles. Very few, if any, of the observed craftspersons wore safety shoes. All safety violations mentioned above are documented in Exhibit II-A-7, page II-56. Specific accounts can be found in Examples H and N.

CONCLUSIONS

Enough instances of poor safety practices were observed to conclude that few craftspersons heed warning or safety signs and act unsafely when performing assigned tasks. Minor instances or accidents lead to nonavailability of anticipated craft resources and a lowering of the productivity potential.

RECOMMENDATION

The Schweinfurt DEH should take measures to increase the daily use of safety practices by craftspersons. Job site accidents or health problems resulting from DEH work should be fully investigated to determine the source of injury or ailment, and corrective action should be taken to prevent further incidents of the same nature.

5.6 DIN (DO IT NOW) TEAM CONCEPT

At several installations previously visited by E. L. HAMM & ASSOCIATES, the institution of a "DIN Team" was observed handling a large portion of service orders.

The creation of a radio-dispatched, service-order shop would lead to quicker response and better utilization of DEH resources. The so-called "DIN Team" concept would incorporate the organization of several cross-trained general mechanics, who would respond to all service calls received by work reception, regardless of the craft nature required. A dispatcher would receive these service calls and would be responsible for tracking each craftsperson by geographic area. Once a craftsperson completes a service order and clears with Service Order Reception, it is the dispatcher's responsibility to direct the craftsperson to the location of the next closest service order.

Several keys to this concept must be considered: (1) for best results, craftspersons should be knowledgeable in all areas of carpentry, plumbing, electricity or masonry that they might encounter, (2) the dispatcher will have to be knowledgeable and experienced as to what types of tasks these craftspersons will be expected to perform, as well as skillful in planning and coordinating incoming service calls with craftspeople in the field, (3) the craftspersons will have to be equipped with hand held two-way radios as well as individual vehicles, stocked with sufficient supplies to cover any possible maintenance/repair that may occur.

The specific implementation of the DIN Team would be at sub-facilities Bad Kissingen, Conn Barracks, and Askren Manors. Due to the physical separation of these facilities (especially Conn Barracks and Bad Kissingen), the organization of small service-order shops dispatched from a central location would be conducive to higher production and quicker service order response time. Small supply substations at each facility, stocked with high-use items, would support the respective DIN Teams. Ideally, DIN Team craftspersons would be dispatched from each substation in the morning and would be kept busy throughout the day answering various service calls assigned to them by the dispatcher.

Should a DIN Team member(s) deplete a supply of service orders for a particular day, coordination between the dispatchers and all shop foremen would help to direct available DIN Team craftspersons to assist with ongoing independent job orders or complex service orders. The key to the organization and optimal utilization of a DIN Team is the flexibility provided each "DIN" craftsperson by hand-held two-way radios and independent vehicular support.

CONCLUSION

The importance of proper DEH vehicular support discussed in Section 5.2. coupled with the evidence of quite large independent job and service order backlogs present a barrier to improved productivity at the Schweinfurt Military Community. The implementation of a DIN shop equipped with radios and small motorized vehicles would help to decrease the service order backlog and increase response time. The DIN shop would also release other DEH shops to concentrate on more complex, independent job orders.

RECOMMENDATION

The Schweinfurt Military Community should implement a DIN (Do It Now) shop, equipped with radios and vehicles, to handle the majority of service calls received from occupants and customers in Conn Barracks, Askren Manors, and Bad Kissingen.

The ideal vehicles for this type of organization are the small motorized carts discussed in Section 5.2. Use of these carts combined with two-way radio communication with the dispatcher would provide an endless source of craft work throughout the day, supported by a vehicle with lockable storage, stocked with high-use items. These vehicles would be kept at secure locations at each sub-facility (e.g. Conn Barracks, Bldg. #73). Craftspersons would report directly to these locations every morning to receive initial assignments from the dispatcher.

The DIN team organization at Schweinfurt would receive all service orders that are either carpentry, plumbing, electric, masonry, or paint in nature. Those service orders which require a high level of craft skill or specialized parts or extensive labor activity would be turned

back in to the dispatcher, by radio, at the day's end for reassignment to the appropriate shops.

As illustrated in Table V-5, the recommended number of DIN team members is six for Schweinfurt (Conn Barracks, Askren Manors, Ledward Barracks) and two for Bad Kissingen. These are minimal labor resource requirements. The distribution of required DIN team members at the three Schweinfurt locations is indeterminable without extensive analysis of service order backlog and daily workload.

TABLE V-5

RECOMMENDED DIN TEAM SIZE
TOTAL SERVICE ORDERS - QUARTERS 1, 2, 3 1984

<u>SHOP NUMBER/NAME</u>	<u>SCHWEINFURT</u>	<u>BAD KISSINGEN</u>
01 Carpentry	1331	333
02 Electric	3567	1406
03 Plumbing	3271	1680
05 Paint	377	142
16 Masonry	<u>342</u>	<u>179</u>
TOTAL	8888	3740
Average per Quarter	2963	1247
Average per Month	988	416
Average per Day	33	14

Using the average number of observed service orders completed per craftsperson per day, as discussed in para. 5.4, page V-17, the recommended minimal DIN team requirement is computed below:

Schweinfurt

33 Avg. DIN Team SO Requested per Day = 6 individuals
5.3 avg. observed SO completed per day

Bad Kissingen

14 Avg. DIN Team SO Requested per Day = 2 individuals
5.3 avg. observed SO completed per day

EXHIBIT V-A

VEHICLE ANALYSIS

Name: Minute-Miser (Cushman)

Description: 3-wheel Gasoline

Length - 82" (2083 mm); Height - 38" (965 mm);
Width - 34-1/2" (876 mm)
(See attached information)

Life Expectancy: 10 years

Original Cost: \$3,200

Operation and Maintenance for Life Expectance:

Gasoline (estimated)	\$ 625 (50 mpg, \$1.20/gallon* @ 10 miles/day)
Tune-up	200 (including oil)
Tires	400 (four sets)
Engine overhaul	1,000 (year five)

*Approximate price of service vehicle fuel.

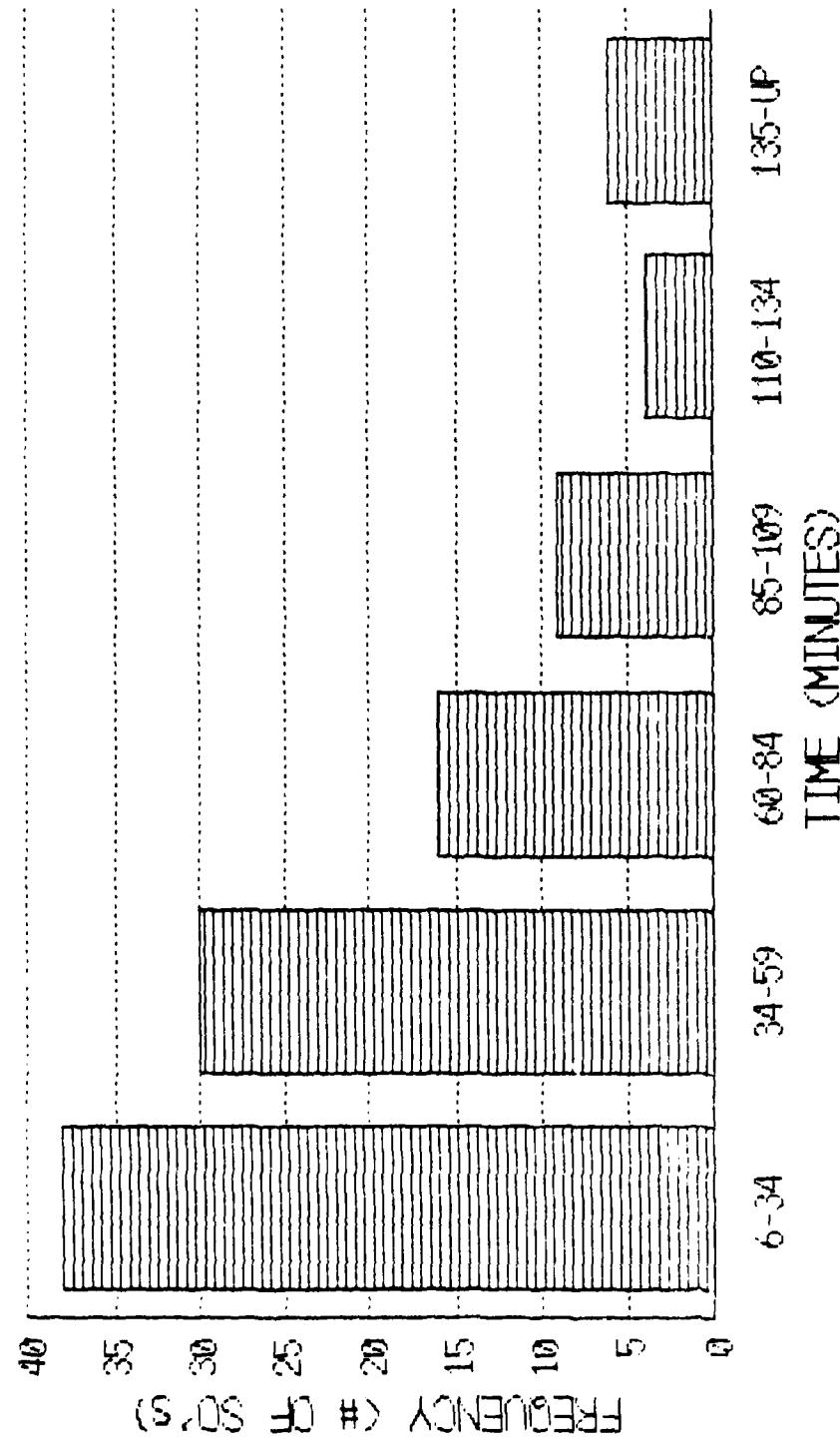
Total Cost \$5,425

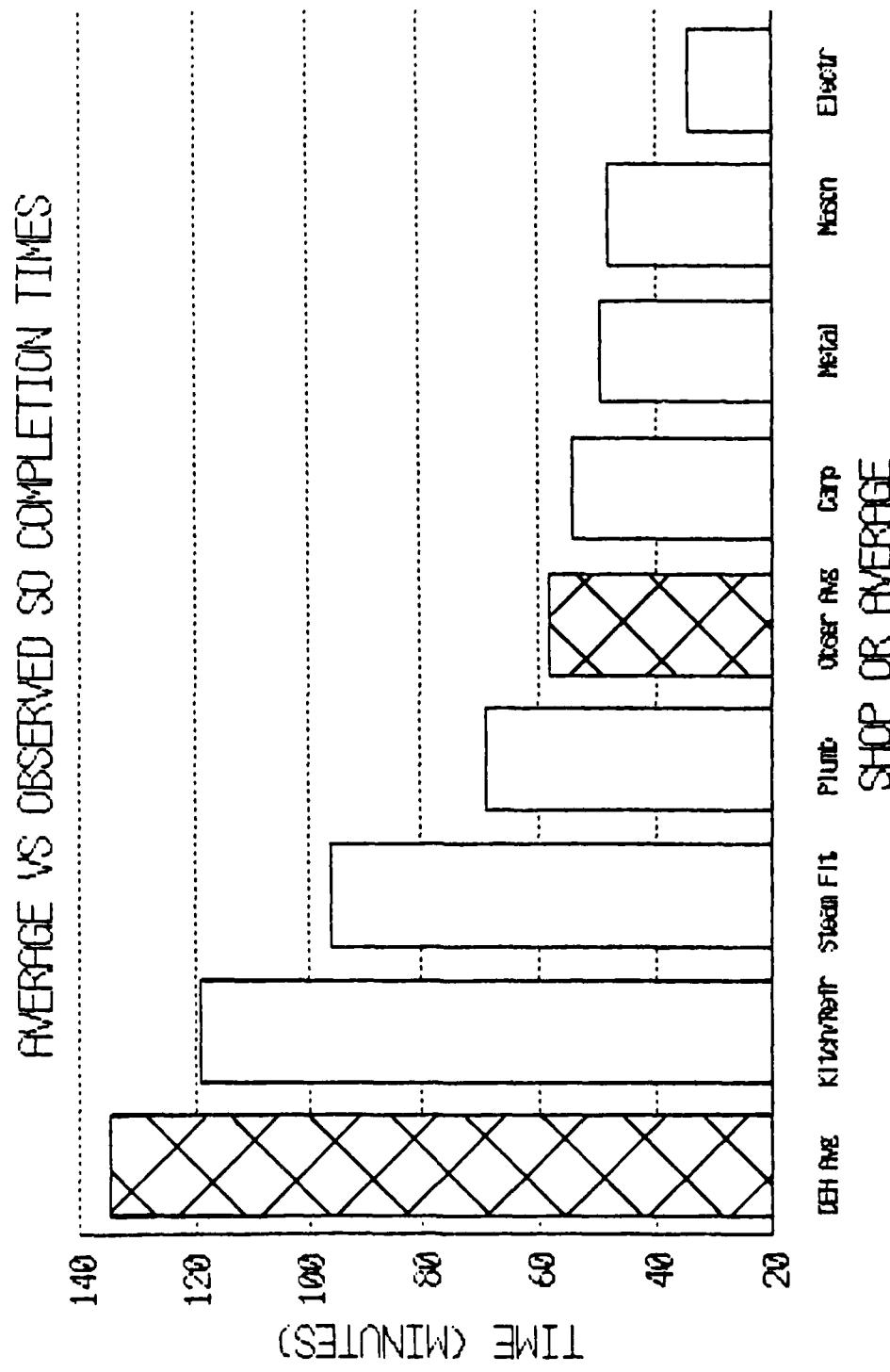
Time Savings Needed to Break-even:

Total Cost/Avg. Hr. Wage = \$5,425/\$4.89 = 1109.4 hours over 10 years
1109/10 = 110.9 hours/year
110.9 x 60 = 6,654 minutes/year
6,654/260 = 25.6 minutes/day

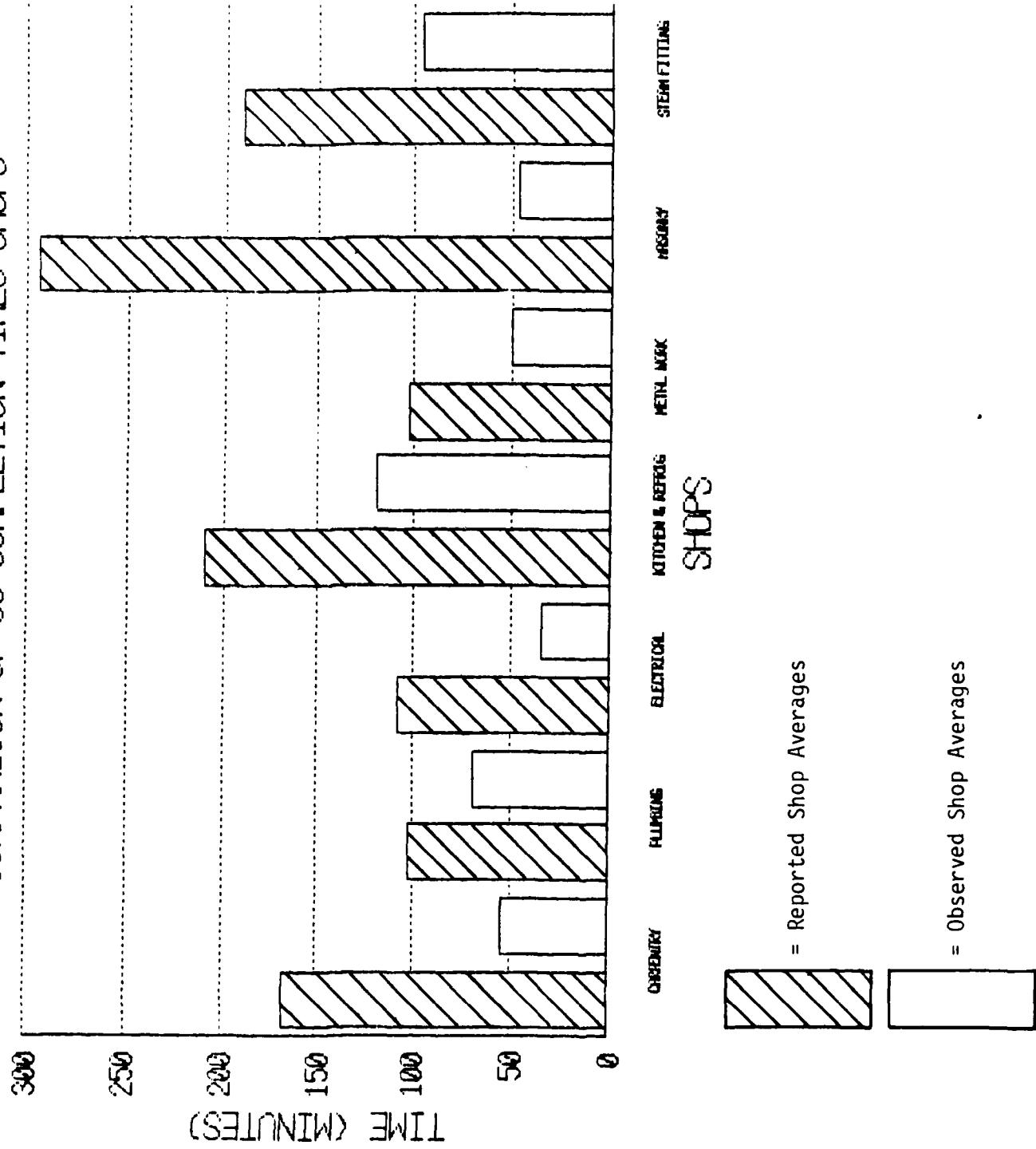
Optional Trailer: \$500

TIME TO COMPLETE OBSERVED SO'S





COMPARISON OF SO COMPLETION TIMES-SHOPS



SECTION VI

PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * HOUSING DIVISION * * *

SECTION VI

PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * HOUSING DIVISION * * *

1.0 INTRODUCTION

The Housing Division at Schweinfurt Military Community, including Bad Kissingen, has an authorized allowance of 48 spaces and 69 assigned. Ten of those assigned are nonappropriated fund employees and 5 are from the German Youth Hire program. The remaining seven spaces are 6 overhires with one military assigned.

The division manages 1,361 government quarters including leased housing and approximately 1,950 housing units through the Housing Referral Office (HRO).

2.0 FINDINGS, CONCLUSIONS, RECOMMENDATIONS

The remainder of this section will consist of findings of fact, conclusions, and recommendations.

2.1 Work Reception

2.1.A Finding. Work reception for Family Housing is located in the Facilities Management Branch of the Housing Division. In a one year period there are approximately 5,000 Service Order calls received for an average of 20 per day. In addition to receiving calls, the Work Receptionist maintains the paint board schedule, does filing, maintains logs and acts as a secretary for the branch. The branch also consists of an Engineer Technician and a Statistical Assistant.

During the on-site visit it was observed in the housing work reception as well as in ERMD that less than five minutes is required to receive and record a Service Order call. Using five minutes as an average it would require only 100 minutes or 20.8% (100/480 = .208) of the day to receive and record the trouble calls. Two or three times each day, after the calls have been logged, the work receptionist delivers the SOS to the ERMD work reception for processing. This requires approximately 8-10 minutes each round trip or as much as 30 minutes per day. The ERMD work reception is a pass through operation to the ERMD Chief, no record keeping or logging is done.

2.1.B Conclusion. Having the work receptionist located in the Housing Division does not make full use of the available hours for this space. It is recognized that filing must be accomplished, the paint board must be maintained and the telephone must be answered; however, there are adequate personnel in the branch to do these functions after work reception is removed.

2.1.C Recommendation. It is recommended the work reception function be transferred into the ERMD area to create continuity and to give assistance to work reception/material coordinator work area. The limited amount of filing and the maintenance of the painting board can be performed by the Statistical Assistant and the telephone monitoring, which would be limited, can be done by the Division Chief's secretary or the Housing Assignment Section located across the hall. By making this adjustment, a significant amount of flexibility should be realized in ERMD Work Reception/Material Coordination and more importantly better utilization of the space in housing can be expected.

A significant amount of the SOs received and material ordered and received by ERMD is in support of housing. Therefore, it is not viewed as a problem for a space assigned and payed for by housing to be physically located in ERMD.

2.2 Self-Help Training

2.2.A Finding. There is a Self-Help program in effect at Schweinfurt. However, there is no procedure in effect to monitor who attends the training classes. The Standing Operating Procedure dated 3 October 1983 makes mention of Family Housing but is heavily slanted toward troop Self-Help.

Section V, paragraph 3 addresses the specific type work that is now being done by craftspersons that is of a self-help nature. Without mandatory compliance to the program, this minor type work will continue. During the interview of the Self-Help Coordinator, he revealed that many of the family housing occupants come to self-help for the first time when they are preparing to clear quarters. This would indicate that any minor work being done in those quarters is being done by craftspersons or PM teams which was verified in the work sampling phase of this study.

2.2.B Conclusion. The Self-Help program must be better utilized in order to make more productive use of craftspersons. For the program to work it must be monitored on a continual basis, identifying that work that is self-help being done by craftspersons and stopping it. There is no requirement for mandatory attendance of Self-Help class for either troops or housing occupants. If a Self-Help program is going to work the functions that are self-help must be identified to occupants and just as important they must know the command is pushing it.

2.2.C Recommendation. The first requirement to installing a workable Self-Help program in Family Housing is to insure that all occupants attend a formal Self-Help class. This can be accomplished by the housing inspector during the initial inspection with the new occupant. It is recommended the inspector assign a class date for the occupant at this time and inform the Self-Help Coordinator of the name, quarters number and date directed to attend. A role call should be taken and those not in attendance should be contacted. Command backing is required to insure attendance. At some activities (Fort Dix, New Jersey, for example) the Post Commander has made attendance mandatory for self-help training.

At the required training session, the occupant should be presented a list of what corrective action should be taken by them and what should not. They should be given a list of materials and tools available at Self-Help and when needed, instruction on tool use and care.

The DA Pamphlet 210-2, Handbook for Family Housing Occupants, is an excellent guide for the self-help program for the family housing occupants and should be provided with each set of quarters.

This recommendation is not intended to relieve the DEH craftspersons of work beyond the capability of the occupant but is intended to free up the highly skilled mechanics to accomplish true work of the trade. There is an adequate backlog already identified in ERMD to justify this change. An additional benefit that cannot be quantified is the dollar savings that can be realized in the Family Housing appropriation for these routine/home owner type jobs.

2.3 Housing Referral Office

2.3.A Finding. The Housing Referral Office is a very active and positive section of the Housing Division. During the on-site visit the HRO Chief was interviewed and frequent observations of the activity in the branch were made. Regardless of the time of day there was a constant group of soldiers in the waiting area to be interviewed ranging from 5 to 15 persons. While the process was somewhat slow, the personnel doing the interviews worked constantly, were very courteous and in general, when the soldiers left, their morale appeared high. In fact, brief conversation with two of them indicated complete satisfaction with the services.

The major problem area that surfaced in HRO is the acute shortage of economy housing and housing on post for single personnel. The City of Schweinfurt and the 26KM radius that HRO searches for housing does not have sufficient rentals to accommodate the demand, nor does there appear to be sufficient transportation for the inspectors to get out and find more.

2.3.B Conclusion. The HRO Branch is a very effective, well organized operation. They are in need of additional transportation, as is the Utilities and B&G Divisions, for administrative purposes.

2.3.C Recommendation. Section V (Maintenance Division) addresses vehicle utilization and has identified vehicle availability. No attempt is made to reallocate specific vehicles; however, one possibility is the establishment of an administrative motor pool run by Organizational Maintenance.

2.4 Family Housing Vacancy Rate

2.4.A Finding. The average days of Family Housing vacancies, including administrative and maintenance time, shows Schweinfurt at 4.09 days and Bad Kissingen at 5.13 days, in accordance with a DoD report dated March 1984. This report ranks activities world wide with Schweinfurt ranking 26th and Bad Kissingen 65th out of a total of 423 activities reported. The Army objective for occupancy is 98 percent, the VII Corps objective is 99 percent while at Schweinfurt and Bad Kissingen the combined occupancy rate is 99.3 percent.

2.4.B Conclusion. While there is always room for improvement, to be ranked in the top 16 percent with maintenance and administrative days being nearly equal, 2.19 and 1.9 days for Schweinfurt and 2.65 and 2.48 for Bad Kissingen, little can be said other than, good job.

2.4.C Recommendation. None.

SECTION VII
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * RPMA SUPPLY SUPPORT * * *

SECTION VII
PRODUCTIVITY REVIEW AND ANALYSIS
OF THE
DIRECTORATE OF ENGINEERING AND HOUSING
AT
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * RPMA SUPPLY SUPPORT * * *

1.0 INTRODUCTION

The Supply Support for the DEH at Schweinfurt Military Community and the subcommunity at Bad Kissingen is provided by RPMA warehouses that are subordinate to the warehouse operation in Nuernberg. The Schweinfurt RPMA maintains approximately 1600 line items and Bad Kissingen has approximately 850 line items.

HAMM ASSOCIATES was informed at the ISAE inbrief that an indepth study of supply operation at Schweinfurt was not to be included in this report because of the pending installation of the FESS system. Therefore, the information presented here is of a surface nature and is included only because of the impact on job scheduling and productive time of the maintenance work force.

2.0 FINDINGS, CONCLUSIONS, RECOMMENDATIONS

The remainder of this section will be presented as findings of fact, conclusions and recommendations.

2.1 Service Orders Awaiting Materials

2.1.A Finding. The Schweinfurt Military Community, less Bad Kissingen, had 138 Service Orders on backlog awaiting materials out of 1,029 total Service Orders on backlog. This represents 13.4% of the routine type work backlogged that could not be accomplished due to lack of materials.

A review of the SOs awaiting materials revealed that the type of items required are common use, high volume items such as curtain rods, light fixtures, locks, key blanks, fuses, fuse boxes and assorted plumbing and electrical materials.

2.1.B Conclusion. It cannot be expected all awaiting material SOs can be eliminated. There is double handling of every SO, for which material is not available, by shop personnel and the Work Reception/Material Coordinator section. The double handling occurs when the SO is sent to the shop, the foreman determines the material is not available and sends it back to ERMD to have material ordered. Once material comes in, the material and the SO is then sent back to the shop. Thus both ERMD and the shop has administratively handled the SO two times before work is completed. This double handling for the most part can and should be reduced. The time required for the Foreman to check each SO and the time needed by the Material Coordinator to order, receive and distribute routine materials must be considered an undesirable waste of effort.

2.1.C Recommendation. In order to improve availability of materials, the number of line items carried in the RPMA warehouse must be increased. For example, the line item count in a typical U.S. Continental DEH supply warehouse is between 2,500 and 3,000. While this number may not be required in Schweinfurt an overall increase over the current 1,600 is warranted. The most effective and efficient manner to increase the quantities is addressed in paragraph 2.2.A thru C.

2.2 Demand System

2.2.A Finding. There is no standard procedure in effect to automatically identify new item demands in order to place them in stock.

The current procedure is for the Foreman/Craftsperson to request what he thinks should be stocked. After requesting an item to be stocked, which appears to be infrequent, approval must come from the Nuernberg RPMA. At Schweinfurt RPMA the quantity of line items carried has not changed in the past 10 months.

The Facility Engineers Supply System (FESS), which is to be installed at RPMA Schweinfurt, has the capability to maintain a history demand file provided a national or local stock number is input to the system and the same number is used each time the item is ordered.

As stated previously, under current procedures all items that are stocked at Schweinfurt and Bad Kissingen must be approved in advance by RPMA Nuernberg. This practice not only delays getting approval for new stock items but, in fact, takes the responsibility of supporting the DEH out of the hands of the RPMA on site.

2.2.B Conclusion. The structures being supported by the DEH are 30-40 years old which would imply a stable supply support. However, there is a continuing upgrade and remodeling program, as well as some new construction, that create demands for newer, state of the art, repair parts. These changes should be creating new demands and thus changes in type and quantities of materials carried in stock. In order for the supply support to keep pace with ever changing needs, a formal history demand system is required.

2.2.C Recommendation. In order to support the craftsperson to the maximum extent possible the everyday routine items used, such as those required for the SOs, 138 awaiting material, should be available. If the FESS terminal to be installed at Schweinfurt is to have the capability

for Schweinfurt to create local stock numbers and input them to the History Demand File, the only additional authorization that would be required, and recommended, is for the local RPMA be permitted to stock those items with six demands without prior approval from Nuernberg. If FESS is not going to have this capability then a manual demand system similar to that used by V Corps should be established in order for the RPMA to satisfy the requirement. Army Regulation 420-17 states that any item that has had six demands in a 12 month period has met the qualification for stock.

The central warehousing system currently used through Nuernberg can and should continue to be used for items that are common use throughout the communities they support. However, latitude must be afforded the local communities to stock items that are peculiar to them.

NOTE: It was not possible, nor included in the scope of this project, to review the entire supply support program in Germany. However, to get maximum support from any supply system, the system must have its ear tuned to the end user of the material carried. If this cannot be accomplished using the central warehousing procedure, consideration should be given to placing the RPMA operation directly under the DEH in the community.

2.3 Shop Stock

2.3.A Finding. The procedures used to maintain Shop Stock do not conform to AR 420-17 which dictates a Shop Stock List will be established for each shop with quantity requirements for 15 day usage. Many of the items that are carried as Shop Stock are not carried in the RPMA warehouse. This leaves it up to the Shop Foreman to maintain a separate supply system in each shop such as that carried in the Air Conditioning/Kitchen Equipment Shop and the Organizational Maintenance Shop.

By definition Shop Stock should be high turnover items, items that are being used on a daily basis for routine type work (Service Orders). Shop Stock should not exceed a 15 day supply in the shops, according to regulation, based on the fact that anything that is Shop Stock should be stocked in the supply support warehouse. During the interview phase of this study it was revealed that it is common practice for shops to order as much as one years supply of materials at a time to insure availability.

2.3.B Conclusion. It is the responsibility of the supply operation to maintain adequate supplies in type and quantity to support the DEH maintenance force. This includes insuring those items that are classified as Shop Stock are in the RPMA warehouse. Shop Foremen/craftspersons time should be utilized in the performance of their trade not in maintaining stock levels in excess of the 15 day authorized.

2.3.C Recommendation. Shop Foremen should be required to identify those items that are high use, routine type items, to the RPMA warehouse. Those items that are not stocked should be placed in stock regardless of whether or not they are stocked in Nuernberg. The primary key to support of the DEH is to have on hand those items that are required regularly at Schweinfurt and Bad Kissingen, not what may be used by some other community. It would be impossible to establish a specific number of line items that should be considered Shop Stock due to even changing needs. It is possible, if given a free hand to order what they want, Foremen could exceed their needs. For this reason Division/Branch Chief should review the list as well as the RPMA chief.

It should be emphasized the items in Shop Stock should be those items that are used on a day to day basis primarily for completion of SOs

and PM work, such as nails, screws, wire, switches, wall sockets, pipe, pipe fittings, washers, plumbing fixtures, etc.

The key point of this recommendation is to insure craftspersons have in their shop, on their truck, or in their tool box a ready supply of materials to conduct their routinely assigned task.

2.4 RPMA Purchase Authority

2.4.A Finding. The RPMA Purchase Agent at Schweinfurt has \$1,000 BPA call authority for each vendor which cannot be used more frequently than every other day. Of the 1,600 items stocked at Schweinfurt, 767 or 47.9% are procured on the local market either by the agent at Schweinfurt or Nuernberg. From July, 1983 through June 1984 a total of 3,880 line items were ordered on BPA and 646 line items were ordered from Nuernberg. All items purchased by Schweinfurt on BPA are for Direct Turnover (DTO) to the shop. None were to maintain stock levels. To further illustrate this, in the same period July 1983 to June 1984, there were 4,319 fringe items, or non-stock items issued out of 32,336 total issues.

2.4.B Conclusion. The Purchase Agent at Schweinfurt should not have restrictions as to what items can be procured. The RPMA has the responsibility to support the DEH and should have maximum authority to do so.

2.4.C Recommendation. The Purchasing Agent at Schweinfurt should have the authority to purchase stock items and also have authority to purchase \$1,000 per day from each vendor.

There is some concern with the RPMA Chief that this would overwork the Purchase Agent and, in fact, initially could. It should be pointed out, however, that with the authority to purchase stock items tied with

the development of a formal demand system should reduce the 3,880 BPA items now being ordered. It is anticipated that many of these items will qualify as stock items which would reduce the number of times they would be ordered during a one year period due to the larger quantities that would be ordered each time.

In addition to increasing the number of stock items, it should dramatically reduce the paperwork and inventory control procedures that are now necessary at the shop level.

SECTION VIII

DIRECTORATE OF ENGINEERING AND HOUSING
THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * EMPLOYEE SURVEY * * *

SECTION VIII

DIRECTORATE OF ENGINEERING AND HOUSING THE SCHWEINFURT MILITARY COMMUNITY, F.R.G.

* * * EMPLOYEE SURVEY * * *

1.0 INTRODUCTION

To assist in the review and analysis of the DEH at Schweinfurt Military Community, an employee survey was distributed to all shop personnel (including Bad Kissingen) serving the community. This survey is intended to provide additional information to be used in identifying areas affecting productivity, as perceived by the workers.

2.0 BACKGROUND

The employee survey was organized into two major categories. The first category (questions 1-28) was designed to measure the employees perception of the DEH organization, while the second part (questions 29-37) was designed to elicit their perceptions of specific areas such as logistic support, planning/estimating and tools and equipment.

Since the respondents were not identified by specific organizational elements (i.e., shops), specific problem areas within DEH cannot be addressed. The results, therefore, are presented as a general overview of DEH.

3.0 QUESTIONNAIRE, PART I

The twenty-eight questions included in the first section are divided into seven subcategories. These subcategories are designed to record employee perceptions of the following organizational elements:

<u>Question</u>	<u>Subcategory</u>
1-3	<u>Organizational Communication</u> - the way information is disseminated which assists getting the job done in the best way possible.

4-6 Organizational Climate - the perceived properties within the work environment which influence employee behavior.

7-9 Organizational Policies and Procedures - the administrative aspects of the organization which enhance productivity.

10-14 Supervisory Effectiveness - the perception of the effectiveness of direct supervision on the productive effort.

15-19 Team Work - the manner in which employees view the work group as a coordinated team working together.

20-24 Internal (Work Group) Communications - the degree in which employees share information on job related events.

25-28 Worker Satisfaction - overall worker perception of how well their individual needs are being met.

The responses in part one of the questionnaire were collected and presented in three separate exhibits. Exhibit VIII-1, page VIII-6, shows the question, category and percentage of response for the five different ratings (Very Little to Very Great) for each question. Additionally, a column representing those respondents who failed to answer a question (No Response) is included as well. Exhibit VIII-1 contains tables for both the Schweinfurt Military Community (less Bad Kissingen) - SMC - and Bad Kissingen. Findings of Fact referencing these percentages will be discussed in a following section.

Exhibit VIII-3, page VIII-13, illustrates graphically the responses received for questions 1-28. In this exhibit, the horizontal axis represents the 7 different subcategories discussed above. The vertical axis represents weighted average rating¹ for each subcategory. The

¹ All questions were answered on a five point Likert Scale. Each "very little extent" answer received one point, each "little extent" answer received two points, etc. A "no response" in a subcategory received zero points. The weighted average rating is the sum of points for a subcategory, divided by the total number of responses in that subcategory.

average rating for all seven subcategories is represented by a solid line. The total results for Schweinfurt Military Community/Bad Kissingen is displayed in Exhibit VIII-3, page VIII-13. Exhibit VIII-3A, page VIII-14, represents Schweinfurt Military Community, and Exhibit VIII-3B, page VIII-15, Bad Kissingen.

4.0 QUESTION, PART II

The nine questions in the second section were added to the survey to provide management with information on areas specific to operations at Schweinfurt. No attempt has been made to analyze this data. The results shown in Exhibit VIII-2, page VIII-10, are a percentage spread of the replies received and are provided for informational purposes only.

5.0 SUMMARY

A survey of attitudes and perceptions provides results which may be used to identify possible areas of concern. It must be remembered that the results provide a one-time "snapshot" of the organization and, therefore, cannot be used as solid evidence that deficiencies exist. It is important that assumptions about differences in answers not be made, but this information should be used as a vehicle to initiate a dialogue with those elements of the organization which indicate less positive perceptions.

5.1 Findings of Fact

A. In total, the average weighted score of 3.89 for questions 1-28 is very high, indicating very positive feelings in the seven subcategories outlined above.

B. In general, workers have somewhat positive feelings about Subcategory A, Organizational Communication. Total score - 3.47.

C. While workers also have relatively good perceptions about Subcategory B, Organizational Climate, over 55% feel that little or very little recognition (a lack of appreciation) is given to people who work hard. Total score - 3.47.

D. The general perception of Subcategory C, Organizational Policies and Procedures indicates that administrative aspects do not effectively enhance productivity. Nearly 50% of the respondents felt that people at higher levels of the organization were not (little/very little) aware of problems at the worker level. Total score - 3.00.

E. Workers' perceptions of Subcategory D, Supervisory Effectiveness, were very high. Over 70% of the respondents felt that supervisors were either great or very great in their effectiveness. Total score - 4.09.

F. Workers viewed highly their work group, Subcategory E, as a coordinated team working together. Over 75% responded in the great/very great category. Total score - 4.17.

G. For Subcategory F, Internal Communications, workers apparently felt that fellow employees shared information to a large extent on job-related events. Total score - 4.04.

H. Overall, Subcategory G, Worker Satisfaction was reported at very high levels. Over 80% of the workers responded to great/very great satisfaction in all subcategory questions. Total score - 4.32.

5.2 Conclusion

As previously stated, valid conclusions cannot be drawn without supporting corroborating information. The findings of fact identified above indicate those areas within the organization which may benefit from open discussions of perceived problems.

In spite of modern technology in computers and management information systems, the human element is still the most vital and complex factor in any operation or service. The manager's function is to plan, direct, control, monitor and motivate subordinate individuals to maximize production. However, reaction to the way managers plan, direct, control, monitor and motivate is based on perception, and not necessarily on fact. A sense of individual worth and organizational recognition is the basic motivator for most individuals, and it is management's responsibility to provide this type of motivating environment.

5.3 Recommendations

In light of the findings of fact and conclusion presented above, the following recommendations are presented:

- A. Peruse the survey results and identify specific segments of the organization with which to open discussions.
- B. Convene a meeting with these personnel and ask what aspects of the organization they were thinking about when answering the survey questions.
- C. Ask for suggestions on how to reduce or eliminate perceived roadblocks to efficient operation.
- D. Listen to suggestions, record them and, if an immediate answer/decision is not possible, specify a date by which an answer/decision will be provided.
- E. Institute a policy for visiting all shops on a periodic basis to share ideas and problems.
- F. Assemble all employees annually (an Organization Day) for an address by the DEH and Base Commander. Use this occasion to recognize superior employee performance.

SURVEY QUESTIONS, CATEGORIES, AND RESPONSE PERCENTAGES
(SCHWEINFURT MILITARY COMMUNITY)

		PERCENTAGES				
		Very Little	Little	Some	Great	Very Great
ORGANIZATIONAL COMMUNICATIONS		7.8	13.3	26.6	18.9	27.2
ORGANIZATIONAL CLIMATE		0.0	5.0	25.0	28.3	36.7
ORGANIZATIONAL POLICIES AND PROCEDURES		0.0	3.3	11.7	20.0	56.7
SUPERVISORY EFFECTIVENESS		15.0	13.3	31.7	23.4	8.3
EXHIBIT VIII-1		2.0	3.7	18.0	25.3	46.3
VIII-6		3.3	5.0	25.0	13.4	50.0
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	46.7
		3.3	1.7	11.7	33.3	46.7
		0.0	0.0	8.3	50.0	36.7
		1.7	5.0	23.3	21.7	43.3
		1.6	6.7	21.7	8.3	55.0
		5.0	3.3	11.7	33.3	

	PERCENTAGES	TEAM WORK				
		Very Little	Little	Some	Great	Very Great
15. To what extent do members of your work group exchange opinions and ideas?	No Response	0.3	3.7	16.0	27.7	47.0
16. How much do members of your work group encourage each other to work as a team?		0.0	3.3	13.3	30.0	46.7
17. To what extent do members of your work group maintain high standards of performance?		1.7	3.3	13.3	23.4	55.0
18. To what extent do members of your work group offer each other ideas for solving job-related problems?		0.0	6.7	18.3	23.4	43.3
19. To what extent does your work group plan together and coordinate its efforts?		0.0	3.3	13.3	23.4	55.0
INTERNAL (WORK GROUP) COMMUNICATIONS		0.0	1.7	21.7	38.3	35.0
20. To what extent do you have confidence and trust in the members of your work group?		1.3	7.3	21.0	22.4	43.7
21. To what extent is information about important job related events widely exchanged within your work group?		0.0	3.3	15.0	21.7	56.7
22. To what extent does your work group make good decisions and solve problems effectively?		0.0	3.3	11.7	21.7	58.3
23. To what extent has your work group been adequately trained to handle emergency situations?		0.0	0.0	15.0	28.3	53.3
24. To what extent do nonsupervisory personnel influence what goes on in your work group?		0.0	16.6	21.7	21.7	36.7
WORKER SATISFACTION		6.7	13.3	41.7	18.3	13.3
25. All in all, how satisfied are you with the people in your work group?		2.5	3.7	9.2	29.2	53.3
26. All in all, how satisfied are you with your supervisor?		1.7	0.0	8.3	23.3	66.7
27. All in all, how satisfied are you with this organization?		1.7	3.3	8.3	30.0	55.0
28. All in all, how satisfied are you with your job?		5.0	8.3	13.3	38.4	31.7
		1.7	3.3	6.7	25.0	60.0

SURVEY QUESTIONS, CATEGORIES, AND RESPONSE PERCENTAGES
(BAD KISSINGEN)

		PERCENTAGES					No Response
		Very Little	Little	Some	Great	Very Great	
ORGANIZATIONAL COMMUNICATIONS							
1.	To what extent is the amount of information you get from your supervisor adequate to meet your daily job assignment?	10.4	8.3	31.3	10.4	29.2	10.4
2.	How receptive are those above you to your ideas and suggestions?	12.5	0.0	18.8	6.2	43.8	18.7
3.	To what extent are you asked for ideas when decisions are being made that will affect you?	6.2	12.5	25.0	18.8	31.3	6.2
ORGANIZATIONAL CLIMATE							
4.	To what extent do you feel motivated to contribute your best efforts to the organization's mission and tasks?	12.5	12.5	50.0	6.2	12.5	6.3
5.	To what extent are there things about this organization (people, policies, or conditions) that encourage you to work hard?	14.6	12.5	10.4	10.4	45.8	6.3
6.	To what extent do people who work hard receive recognition (e.g. incentive awards)?	6.2	0.0	6.2	0.0	81.3	6.3
ORGANIZATIONAL POLICIES AND PROCEDURES							
7.	To what extent are work activities sensibly organized in your shop?	0.0	18.8	37.5	25.0	6.2	12.5
8.	To what extent is the workload and time available taken into consideration in planning your work group assignments?	18.8	37.5	18.8	12.5	6.2	6.2
9.	People at higher levels of the organization are aware of the problems at your level.	18.8	43.8	6.2	12.5	12.5	6.2
SUPERVISORY EFFECTIVENESS							
10.	To what extent does your supervisor encourage the members of your work group to work as a team?	3.8	18.7	15.0	8.7	47.5	6.3
11.	To what extent does your supervisor encourage the members of your work group to give their best effort?	0.0	12.5	25.0	18.7	43.8	0.0
12.	To what extent does your supervisor expect high standards of performance from the members of your work group?	0.0	31.3	12.5	6.2	50.0	0.0
13.	To what extent does your supervisor help you plan, organize and schedule your work ahead of time?	6.2	25.0	6.3	12.5	37.5	12.5
14.	To what extent does your supervisor offer you ideas to help solve job-related problems?	12.5	12.5	18.7	0.0	43.8	12.5

		- PERCENTAGES -				
		Very Little	Little	Some	Great	Very Great
TEAM WORK		0.0	7.5	25.0	26.3	32.5
	15. To what extent do members of your work group exchange opinions and ideas?	0.0	6.2	25.0	43.8	12.5
	16. How much do members of your work group encourage each other to work as a team?	0.0	12.5	31.3	6.2	43.8
	17. To what extent do members of your work group maintain high standards of performance?	0.0	12.5	12.5	12.5	56.3
	18. To what extent do members of your work group offer each other ideas for solving job-related problems?	0.0	6.2	18.8	37.5	31.3
	19. To what extent does your work group plan together and coordinate its efforts?	0.0	0.0	37.5	31.3	18.7
INTERNAL (WORK GROUP) COMMUNICATIONS		3.8	7.5	12.5	28.7	43.7
	20. To what extent do you have confidence and trust in the members of your work group?	6.2	0.0	18.8	6.2	68.8
	21. To what extent is information about important job related events widely exchanged within your work group?	6.2	12.5	12.5	31.3	37.5
	22. To what extent does your work group make good decisions and solve problems effectively?	0.0	6.2	12.5	31.3	50.0
	23. To what extent has your work group been adequately trained to handle emergency situations?	0.0	6.2	12.5	31.3	37.5
	24. To what extent do nonsupervisory personnel influence what goes on in your work group?	6.3	12.5	6.2	43.8	25.0
WORKER SATISFACTION		6.2	0.0	0.0	25.0	68.8
	25. All in all, how satisfied are you with the people in your work group?	4.7	3.1	1.5	26.6	62.5
	26. All in all, how satisfied are you with your supervisor?	6.2	6.3	6.2	12.5	68.8
	27. All in all, how satisfied are you with this organization?	6.3	6.2	0.0	56.3	25.0
	28. All in all, how satisfied are you with your job?	0.0	0.0	12.5	87.5	0.0

EXHIBIT VIII-2

SURVEY RESULTS QUESTIONS 29-37

	<u>RESPONSE PERCENTAGES</u>		
	<u>Total</u>	<u>SMC</u>	<u>BK</u>
29. In general, do you think the supply support provided is:			
EXCELLENT	4.0	5.0	0.0
GOOD	43.4	45.0	37.5
FAIR	31.6	31.7	31.2
POOR	14.5	13.3	18.8
VERY POOR	2.6	1.7	6.3
NO RESPONSE	3.9	3.3	6.2
30. In general, do you feel the planning and estimating for your assignments are:			
UNDERESTIMATED	15.8	11.7	31.2
OVERESTIMATED	2.6	3.3	0.0
ARE ACCURATE	55.3	55.0	56.2
I DON'T KNOW	17.1	20.0	6.3
NO RESPONSE	9.2	10.0	6.3
31. Are vehicle assignments adequate for your shop?			
YES	42.1	40.0	50.0
NO	31.6	31.7	31.3
I DON'T KNOW	7.9	6.6	12.5
NO RESPONSE/NOT APPLY	18.4	21.7	6.2
32. The equipment and tools provided by the Government are:			
EXCELLENT	1.3	1.7	0.0
SATISFACTORY	46.1	45.0	50.0
POOR	43.4	43.3	43.8
UNSATISFACTORY	1.3	1.7	0.0
NO RESPONSE	7.9	8.3	6.2
33. For the work you do, do you feel you are:			
PAID FAIRLY	19.8	20.0	18.8
UNDERPAID	51.3	50.0	56.2
OVERPAID	0.0	0.0	0.0
DON'T KNOW	18.4	16.7	25.0
NO RESPONSE	10.5	13.3	0.0

EXHIBIT VIII-2 (continued)

RESPONSE PERCENTAGES

	<u>Total</u>	<u>SMC</u>	<u>BK</u>
34. When going to pick up material for an IJO, you find the material is:			
ALWAYS THERE	15.8	13.3	25.0
USUALLY THERE	63.2	60.0	75.0
USUALLY NOT THERE	3.9	5.0	0.0
NEVER THERE	1.3	1.7	0.0
NO RESPONSE	15.8	20.0	0.0
35. Work is interrupted due to nonavailability of material:			
OFTEN	1.3	1.7	0.0
HALF THE TIME	25.0	30.0	6.2
SELDOM	51.3	50.0	56.3
NEVER	15.8	10.0	37.5
NO RESPONSE	6.6	8.3	0.0
36. In general, do you feel you are:			
OVERWORKED	13.2	8.3	31.3
UNDERWORKED	10.5	11.7	6.2
NEITHER	59.2	60.0	56.3
DON'T KNOW	9.2	10.0	6.2
NO RESPONSE	7.9	10.0	0.0
37. How often does your foreman visit you at the job site?			
ONCE A DAY	19.7	16.7	31.2
MORE THAN ONCE A DAY	67.1	70.0	56.3
ONCE A WEEK	0.0	0.0	0.0
SELDOM	6.6	5.0	12.5
NO RESPONSE	6.6	8.3	0.0

EXHIBIT VIII-2 (continued)

RATINGS - QUESTION 1-24

- 1 - To a very little extent
- 2 - To a little extent
- 3 - To some extent
- 4 - To a great extent
- 5 - To a very great extent

RATINGS - QUESTION 25-28

- 1 - Very dissatisfied
- 2 - Somewhat dissatisfied
- 3 - Neither satisfied nor dissatisfied
- 4 - Fairly satisfied
- 5 - Very satisfied

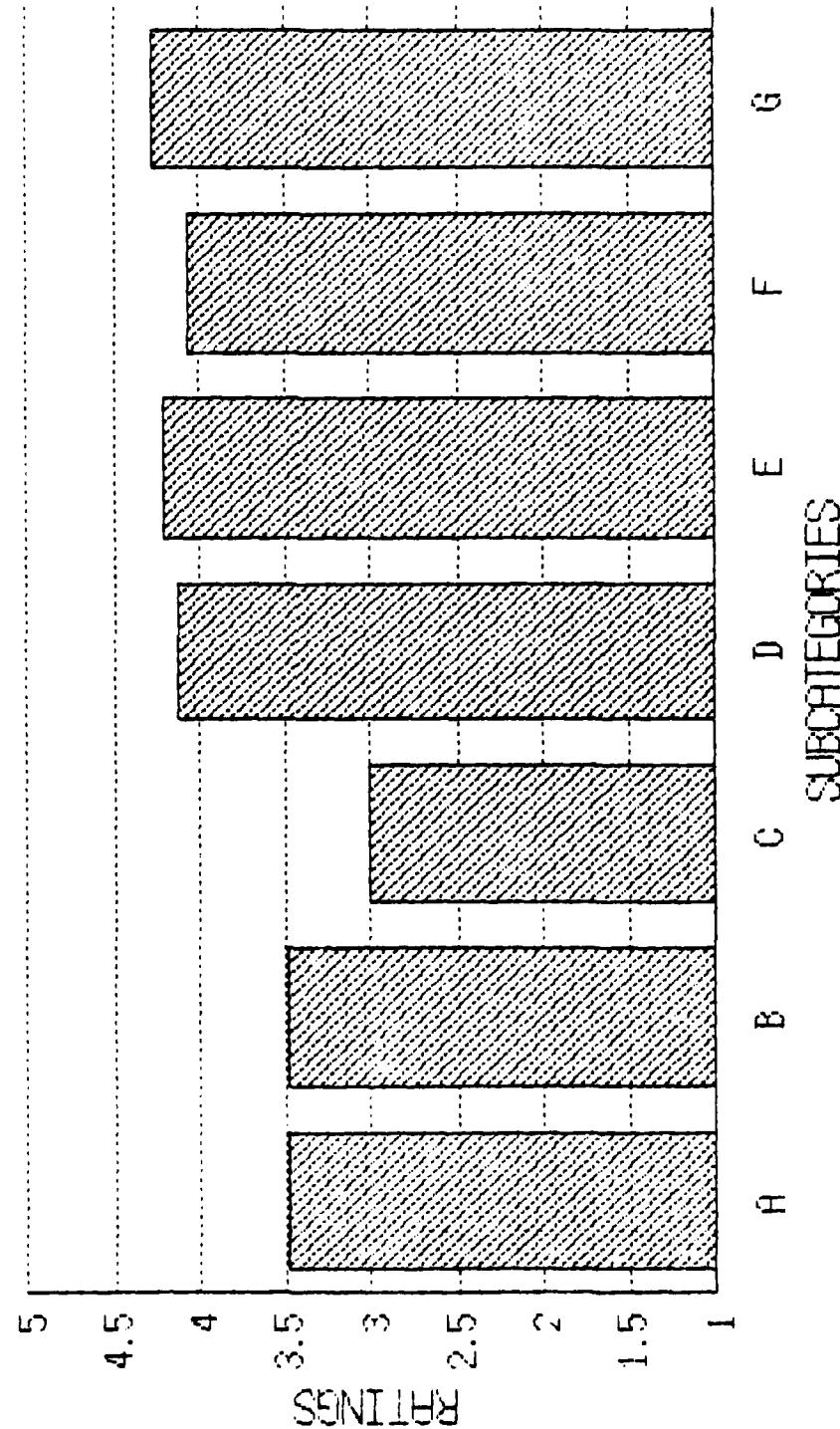
CATEGORIES

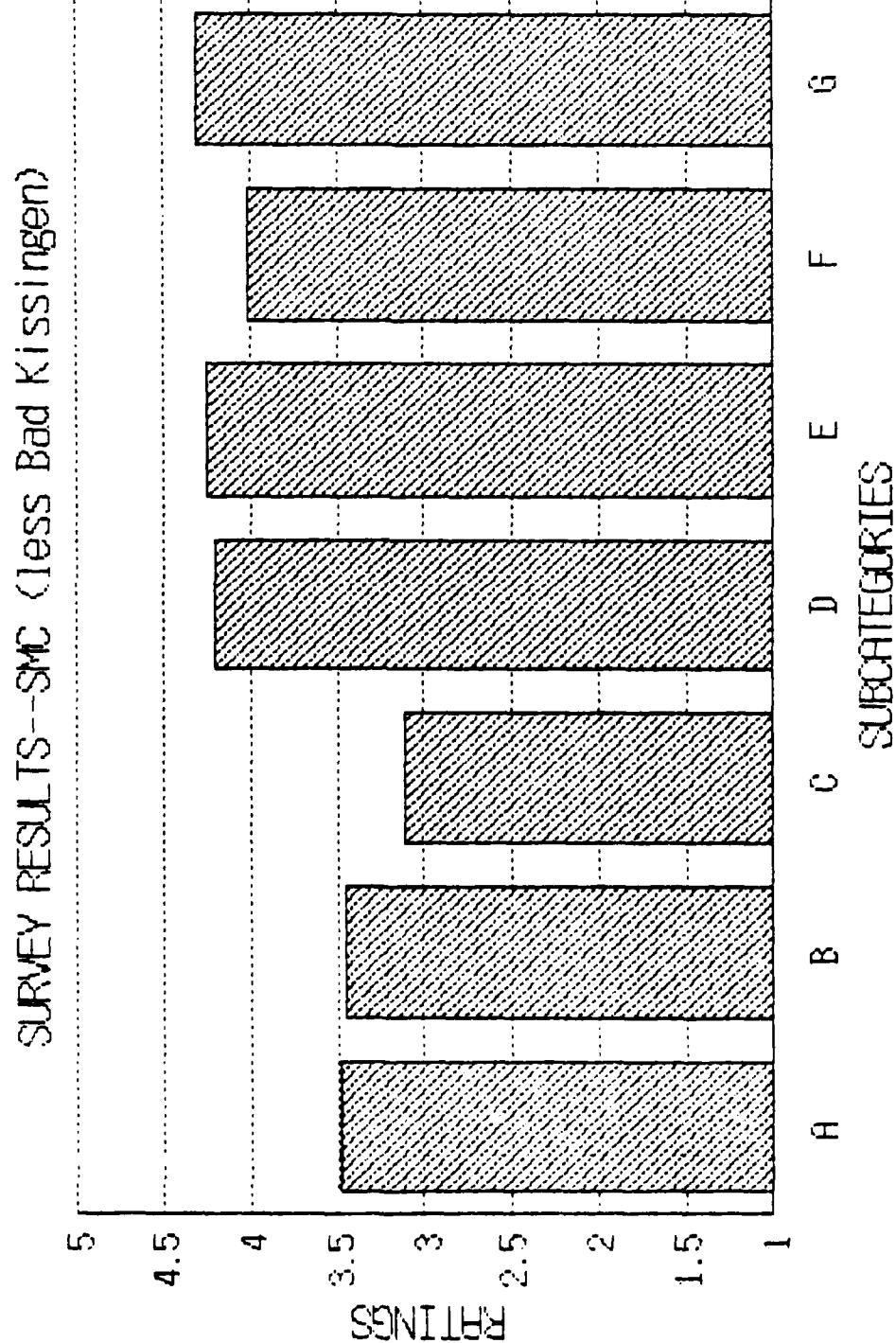
- A. Organizational Communications
- B. Organizational Climate
- C. Organizational Policies and Procedures
- D. Supervisory Effectiveness
- E. Team Work
- F. Internal (Work Group) Communications
- G. Worker Satisfaction

SUBCATEGORIES

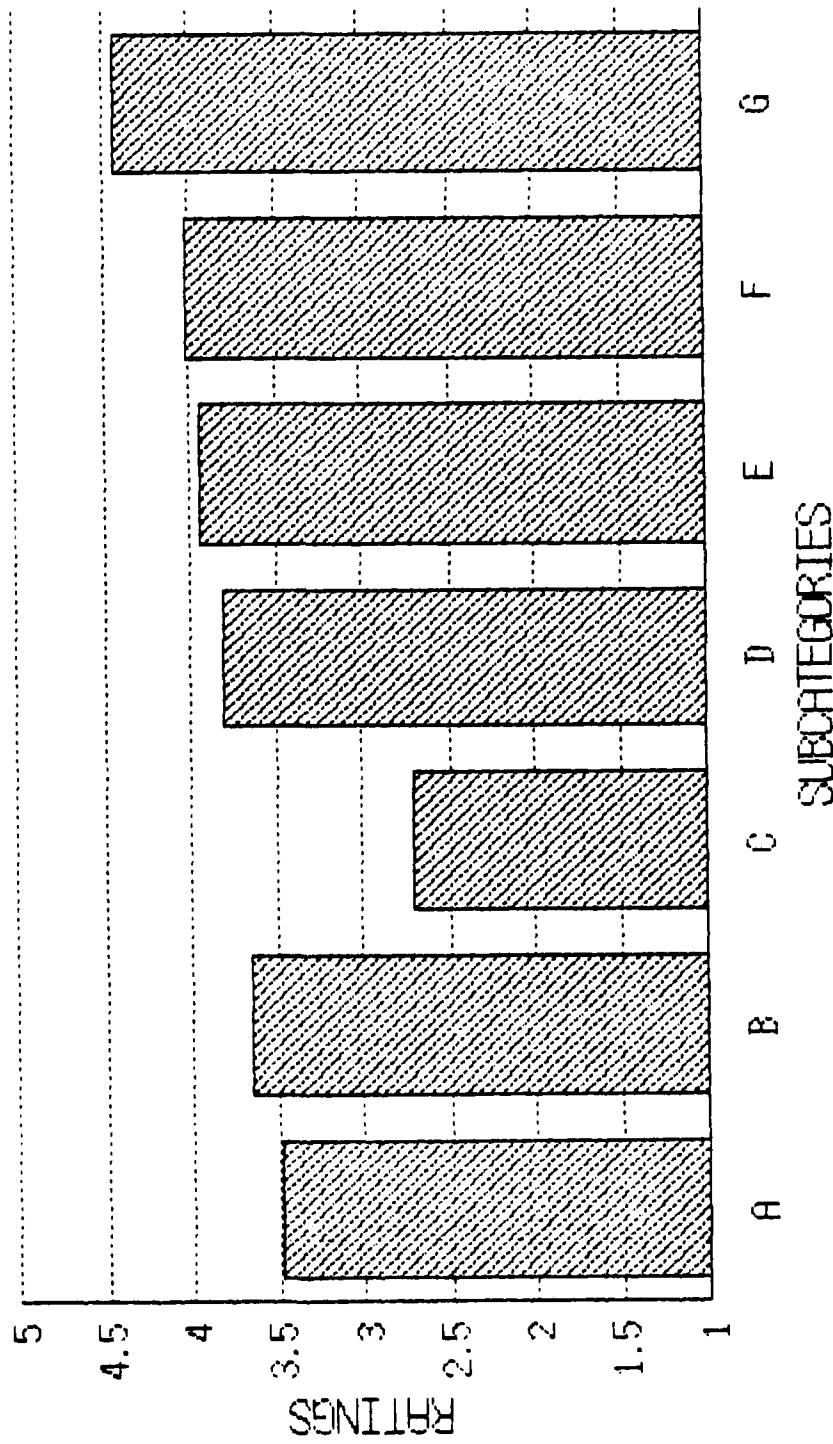
- A. Organizational Communications
- B. Organizational Climate
- C. Organizational Policies and Procedures
- D. Supervisory Effectiveness
- E. Team Work
- F. Internal (Work Group) Communications
- G. Worker Satisfaction

SURVEY RESULTS -- TOTAL





SURVEY RESULTS--BAD KISSINGEN



Ueberblick fuer DFE Angestellte
DFE Employee QuestionnaireAllgemeine Information
Demographic Data

Wie lange sind Sie mit DFE beschaeftigt? _____
How long have you been at this command?

Wie lange sind Sie jetzt beschaeftigt bei Ihrer jetzigen
Arbeitsgruppe? _____
How long have you been assigned to your present work group?

Wie viele Dienstjahre sind Sie jetzt mit dem U.S. Government
beschaeftigt? _____
How many years of federal service have you accumulated?

Was ist Ihre jetzige Verdienstklasse? _____
What is your current pay grade?

Zu welchem Betrieb oder Werkstatt sind Sie jetzt angewiesen? _____
To what shop are you assigned?

Was sind Ihre jetzigen Zukunftsplaene? (Bitte nur eine Antwort ankreuzen)
What are your current work plans? (Please circle one choice)

- a. Vollendung der Arbeitsjahre (Pension) mit DFE.
To remain at DFE until retirement.
- b. Arbeitswechsel.
To seek employment elsewhere.
- c. Unentschlossen mit meinen Arbeitsplaenen.
Undecided about my work plans.

Anleitung
(Survey Instructions)

1. Der Wert dieses Fragebogens haengt von Ihren aufrichtigen und gewissen haften Beantwortungen aller Fragen ab. Alle Fragebogen werden vertraulich behandelt.
The value of this survey depends upon your being straight forward in answering this questionnaire. Your answer sheets will be collated by E. L. Hamm and Associates, and no one from your organization will see them.
2. Beantworten Sie bitte alle Fragen mit einem Kreuz in dem vorgesehenen Karo zu Ihrem besten Wissen.
All questions can be answered by checking the appropriate space. If you do not find the exact answer that fits your case, select the one that is closest to it.

3. Jede Frage hat fuenf moegliche Antworten. Waehlen Sie Ihre Antworten sorgfaeltig.
 Each question has five possible responses. To answer these questions, go through them carefully one at a time and check one answer that best represents your feelings.

4. Dieses ist keine Pruefung, also gibt es keine richtigen oder falschen Antworten.
 THIS IS NOT A TEST, so there are no right or wrong answers. The best answer is the one which most accurately describes how you feel about each issue.

Beachtung: In den folgenden Fragen, die Arbeitsgruppe bezieht sich auf alle Personen unter Anleitung eines Vorgesetzten oder Aufseher, Organisation bezieht sich auf die ganze DFE.

NOTE: In the following questions, WORK GROUP refers to all those persons who report to the same supervisor. ORGANIZATION refers to the entire DFE.

sehr wenig
To a very little extent
etwas
To a little extent
etwas mehr
To some extent
viel mehr
To a great extent
sehr viel
To a very great extent

1. In welchem Ausmass erhalten Sie Ihre genauen Arbeitsanweisungen von Ihren Vorsteher oder Meister?
 To what extent is the amount of information you get from your supervisor adequate to meet your daily job assignments?

2. Kommt man Ihren Ideen und Vorschlaegen entgegen?
 How receptive are those above you to your ideas and suggestions?

3. Fragt man Sie nach Ihrer Meinung wenn neue Entschluesse und Veraenderungen getroffen werden, das Sie betrifft?
 To what extent are you asked for ideas when decisions are being made that will affect you?

4. In welchem Ausmass fuehlen Sie sich verpflichtet fuer Ihre besten Leistungen?
 To what extent do you feel motivated to contribute your best efforts to the organization's mission and tasks?

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5. In welchem Ausmass gibt es Dinge in dieser Organisation (Leute, Verordnungen, oder Bedingungen) dass sie zu harter Arbeit anstrebt.
 To what extent are there things about this organization (people, policies or conditions) that encourage you to work hard?

6. In welchem Ausmass erhalten Sie Anerkennungen z.B. fuer extra schwere Leistungen?
 To what extent do people who work hard receive recognition (e.g. incentive awards)?

7. In welchem Ausmass ist Ihre Taetigkeit in Ihrer Arbeitsstelle organisiert?
 To what extent are work activities sensibly organized in your shop?

8. In welchem Ausmass gibt man Ihnen Zeit fuer Ihre Arbeitsauftraege zu beenden.
 To what extent is the workload and time available taken into consideration in planning your work group assignments?

9. Erkennen Leute in hoeherer Position Ihre Probleme in niedrigerer Position?
 People at higher levels of the organization are aware of the problems at your level.

10. In welchem Ausmass foerdert Ihr Vorgesetzter die Zusammenarbeit aller Mitarbeiter?
 To what extent does your supervisor encourage the members of your work group to work as a team?

11. In welchem Ausmass ermutigt Ihr Vorsteher Ihre Arbeitsgruppe fuer beste Leistungen?
 To what extent does your supervisor encourage the members of your work group to give their best effort?

sehr wenig
 To a very little extent
 etwas
 To a little extent
 etwas mehr
 To some extent
 viel mehr
 To a great extent
 sehr viel
 To a very great extent

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Sehr wenig
 To a very little extent
 etwas
 To a little extent
 etwas mehr
 To some extent
 viel mehr
 To a great extent
 sehr viel
 To a very great extent

12. In welchem Ausmass erwartet Ihr Vorsteher hoechste Arbeitsansprueche von den Mitgliedern Ihrer Arbeitsgruppe?

To what extent does your supervisor expect high standards of performance from the members of your work group?

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13. In welchem Ausmass hilft Ihnen Ihr Vorsteher mit Ihren Arbeitsplaenen im Voraus?

To what extent does your supervisor help you plan, organize and schedule your work ahead of time?

--	--	--	--	--

14. Hilft Ihnen Ihr Vorsteher mit Ideen, Arbeitsprobleme zu loesen?

To what extent does your supervisor offer you ideas to help solve job-related problems?

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15. In welchem Ausmass, wechseln Sie Ideen und Meinungen mit Mitgliedern Ihrer Arbeitsgruppe?

To what extent do members of your work group exchange opinions and ideas?

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16. Wie viele Mitglieder in Ihrer Arbeitsgruppe foerdern Zusammenarbeit als ein Team?

How much do members of your work group encourage each other to work as a team?

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17. In welchem Ausmass behalten Mitglieder in Ihrer Arbeitsgruppe hohe Ansprueche in Verrichtung der Arbeit?

To what extent do members of your work group maintain high standards of performance?

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18. In welchem Ausmass helfen sich Mitglieder in Ihrer Arbeitsgruppe untereinander, mit Ideen um Arbeitsprobleme zu loesen?

To what extent do members of your work group offer each other ideas for solving job-related problems?

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sehr wenig To a very little extent	etwas To a little extent	etwas mehr To some extent	viel mehr To a great extent	sehr viel To a very great extent
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19. In welchem Ausmass plant und koordiniert Ihre Arbeitsgruppe Ihre Bemuehungen?
To what extent does your work group plan together and coordinate its efforts?

20. In welchem Ausmass haben Sie Vertrauen zu den Mitgliedern in Ihrer Arbeitsgruppe?
To what extent do you have confidence and trust in the members of your work group?

21. In welchem Ausmass besprechen Sie wichtige Informationen und Ereignisse mit Ihren Arbeitskollegen.
To what extent is information about important job related events exchanged within your work group?

22. In welchem Ausmass trifft Ihre Arbeitsgruppe gute Entscheidungen und loest Probleme?
To what extent does your work group make good decisions and solve problems effectively?

23. In welchem Ausmass ist Ihre Arbeitsgruppe fuer Notfaelle geschult.
To what extent has your work group been adequately trained to handle emergency situations?

24. In welchem Ausmass hat Arbeitspersonal Einfluss in Ihrer Arbeitsgruppe?
To what extent do non-supervisory personnel influence what goes on in your work group?

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nicht zufrieden	Very dissatisfied
ebens unzufrieden	Somewhat dissatisfied
nicht befriedigt oder unzufrieden	Neither satisfied nor dissatisfied
etwas befriedigt	Fairly satisfied
sehr befriedigt	Very satisfied

25. Alles in Allem, sind Sie zufrieden mit den Leuten in Ihrer Arbeitsgruppe?
 All in all, how satisfied are you with the people in your work group?

26. Alles in Allem, sind Sie zufrieden mit Ihrem Vorsteher?
 All in all, how satisfied are you with your supervisor?

27. Alles in Allem, sind Sie zufrieden mit Ihrer Organisation?
 All in all, how satisfied are you with this organization?

28. Alles in Allem, sind Sie zufrieden mit Ihrer Arbeitsstelle?
 All in all, how satisfied are you with your job?

Nachtragliche Information. Bitte machen Sie ein Kreuz fuer die meist passende Antwort.
Check the one response you feel is most appropriate.

29. Im allgemeinen, glauben sie die Materialversorgung ist:
In general, do you think the supply support provided is:

VORTREFFLICH EXCELLENT	GUT GOOD	FAIR FAIR	DUERFTIG POOR	SEHR DUERFTIG VERY POOR
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Im allgemeinen, glauben Sie die Berechnungen fuer Ihre Arbeitsplaene sind:
In general, do you feel the planning and estimating for your job assignments are:

UNTERSCHAETZT UNDERESTIMATED	UEBERSCHAETZT OVERESTIMATED	RICHTIG ARE ACCURATE	WEISS NICHT I DON'T KNOW
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

31. Stehen angemessene Fahrzeuge zu Ihrer Verfuegung fuer Ihre Arbeitsstelle?
Are vehicle assignments adequate for your shop?

JA YES	NEIN NO	WEISS NICHT I DON'T KNOW
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

32. Die Einrichtungen und Werkzeuge die von der Regierung zur Verfuegung stehen sind:
The equipment and tools provided by the Government are:

VORTREFFLICH EXCELLENT	GUT SATISFACTORY	FAIR POOR	DUERFTIG UNSATISFACTORY
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

33. Fuer die Arbeit die Sie verrichten glauben Sie, sie sind:
For the work you do, do you feel you are:

GUT BEZAHLT PAID FAIRLY	UNTERBEZAHLT UNDERPAID	UEBERBEZAHLT OVERPAID	WEISS NICHT DON'T KNOW
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

34. Wenn Sie Material abholen fuer IJO, finden Sie, das Material ist:
When going to pick up material for an IJO, you find the material is:

IMMER ZUERHALTEN
ALWAYS THERE

GEWOEHNLICH ZUERHALTEN
USUALLY THERE

GEWOEHNLICH NICHT ZU ERHALTEN
USUALLY NOT THERE

NIEMALS ZU ERHALTEN
NEVER THERE

35. Arbeit ist unterbrochen, wegen nicht zu habenes Material:
Work is interrupted due to nonavailability of material:

SEHR OFT
OFTEN

NICHT OFT
HALF THE TIME

SELTEN
SELDOM

NIEMALS
NEVER

36. Im allgemeinen, glauben Sie, sie sind:
In general, do you feel you are:

UEBERARBEITET
OVERWORKED

NICHT UEBERARBEITET
UNDERWORKED

KEIN VON BEIDEN
NEITHER

WEISS NICHT
DON'T KNOW

37. Wie oft kommt Ihr Vorarbeiter zu Ihrer Arbeitsstelle?
How often does your foreman visit you at the job site?

EINMAL AM TAG
ONCE A DAY

MEHRERE MALE AM TAG
MORE THAN ONCE A DAY

EINMAL IN DER WOCHE
ONCE A WEEK

SELTEN
SELDOM

Anmerkung:

Additional Comments:

END

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2-85

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